Oct. 27, 1936. E. DAVIS 2,058,668

PHOTOELECTRIC SAFETY CONTROL

Original Filed Aug. 25, 1930 3 Sheets-Sheet 1

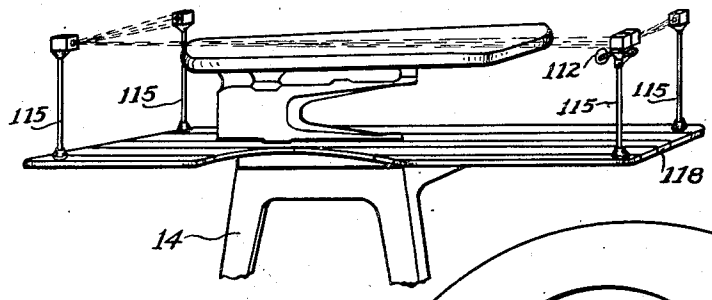


Fig-1-

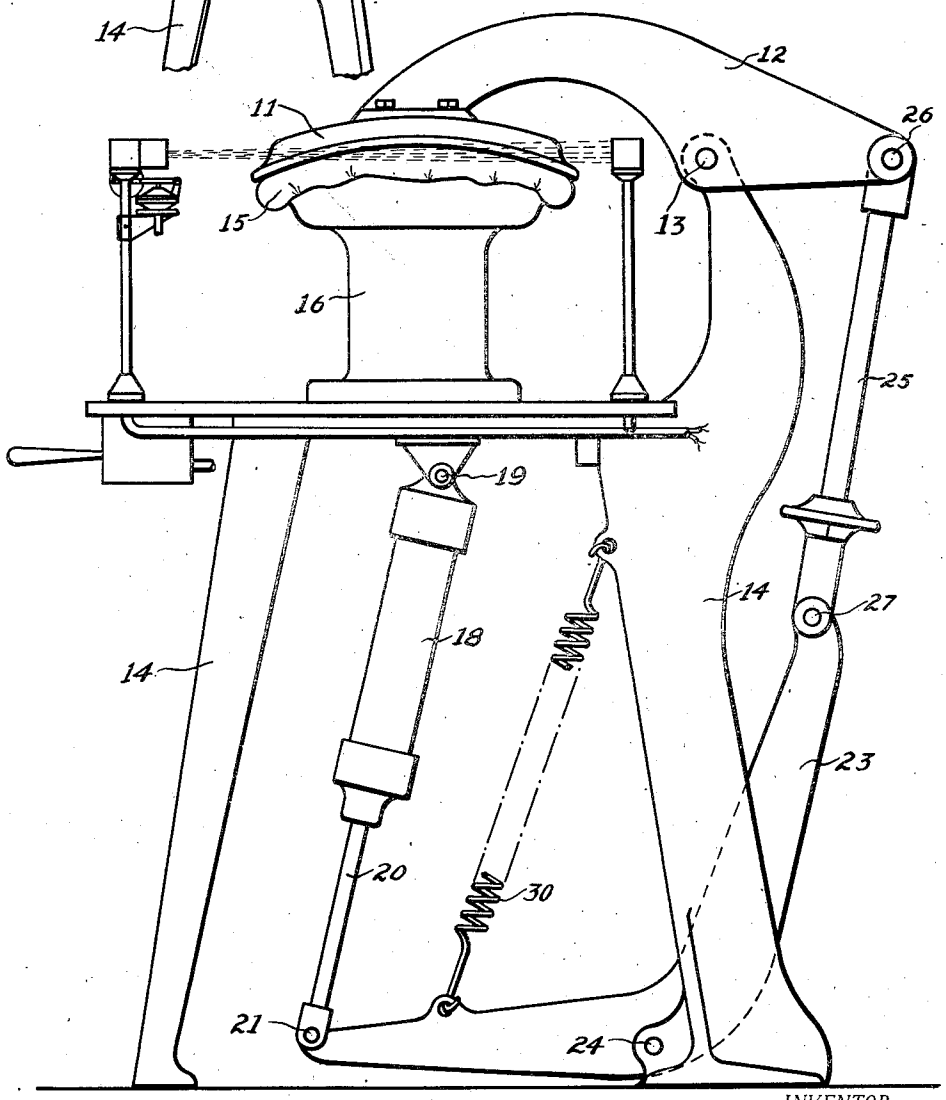


Fig-2-

INVENTOR.
Ernest Davis
BY
Bodell + Thompson
ATTORNEYS.

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Original Filed Aug. 25, 1930 3 Sheets-Sheet 2

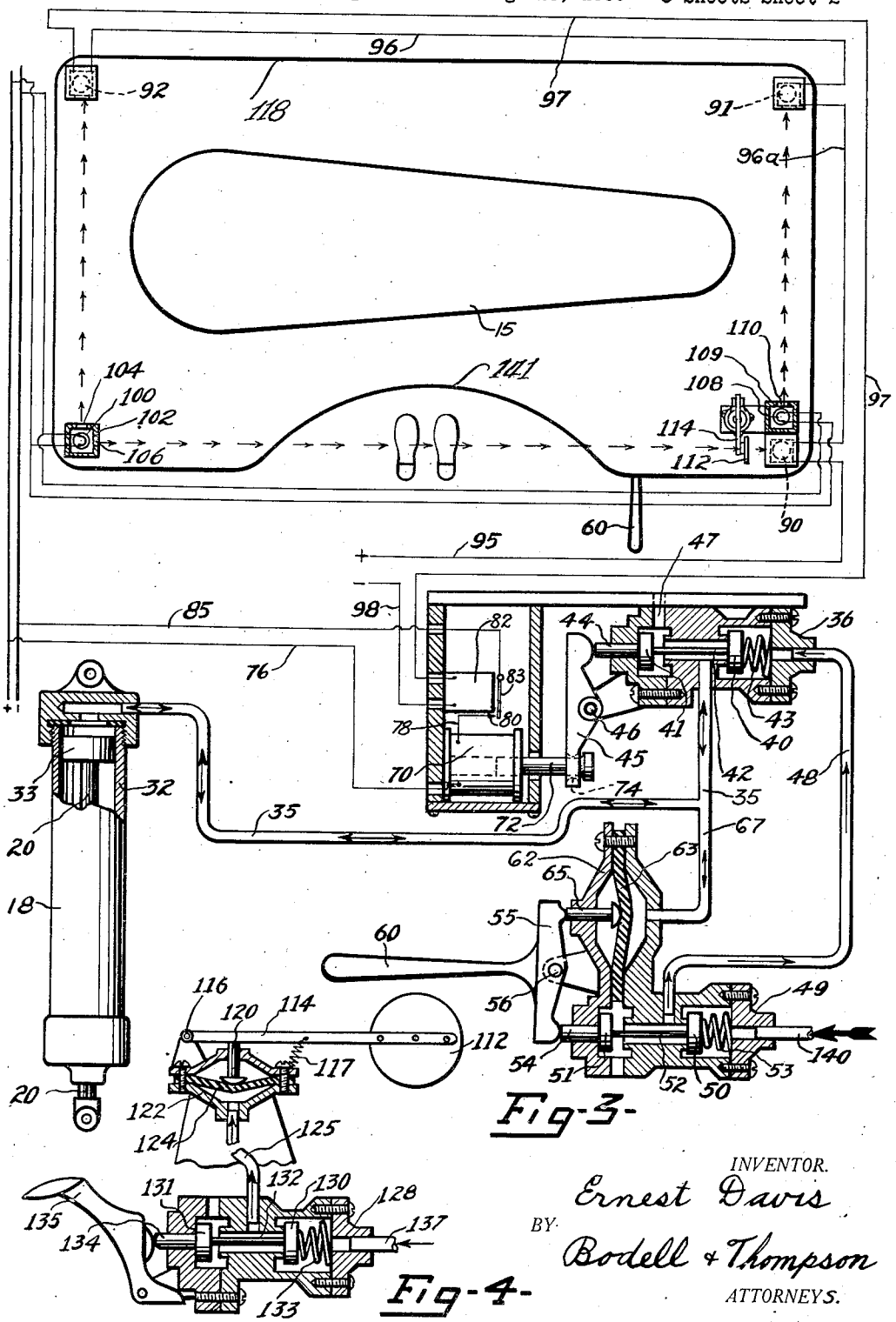


Fig-3-

Fig-4-

INVENTOR.
Ernest Davis
BY
Bodell & Thompson
ATTORNEYS.

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PHOTOELECTRIC SAFETY CONTROL

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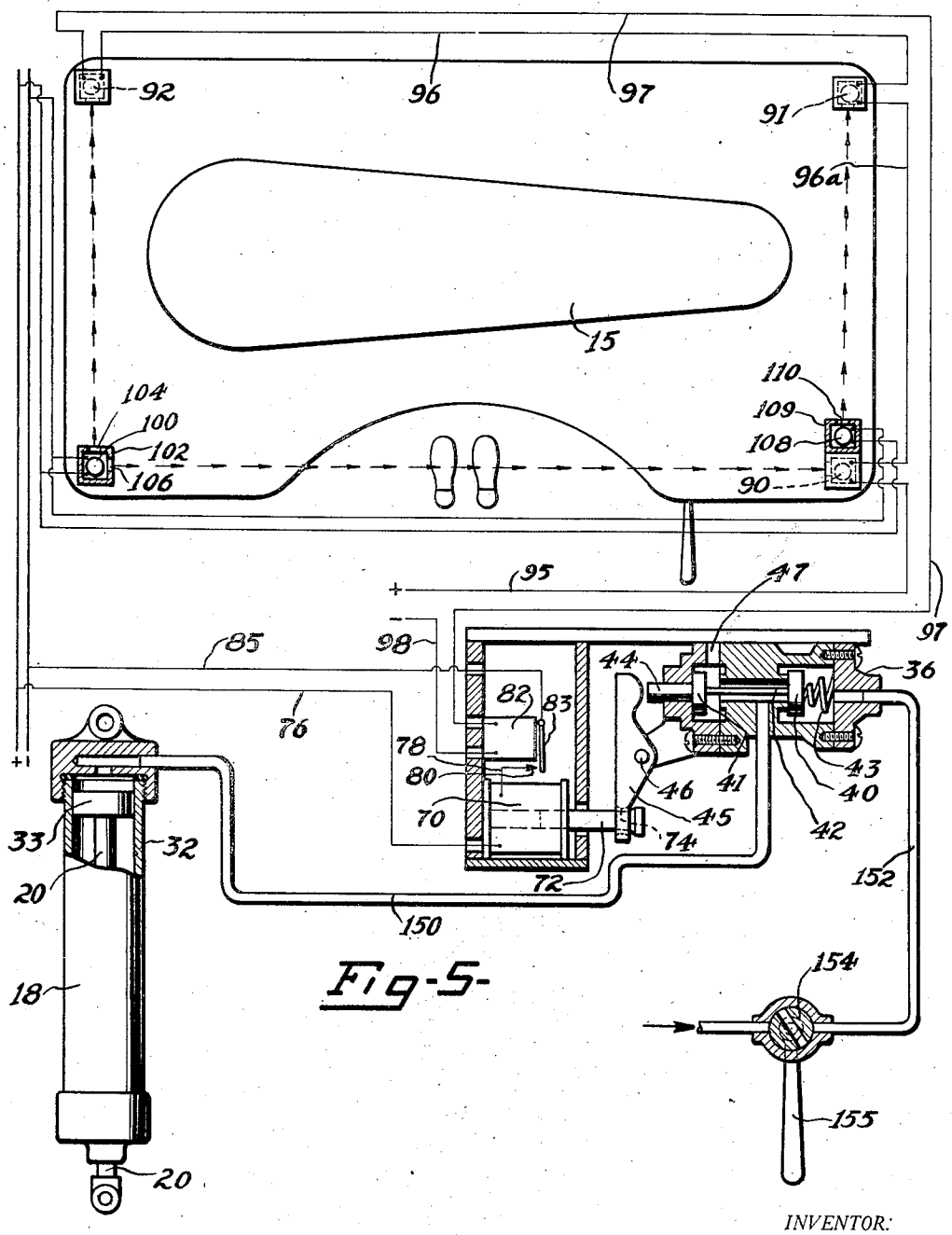


Fig-5-

INVENTOR:
Ernest Davis
BY
Bodell & Thompson
ATTORNEYS.

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UNITED STATES PATENT OFFICE

2,058,668

PHOTOELECTRIC SAFETY CONTROL

Ernest Davis, Syracuse, N. Y., assignor to The Prosperity Company Inc., Syracuse, N. Y., a corporation of New York

Application August 25, 1930, Serial No. 477,573
Renewed March 4, 1936

16 Claims. (Cl. 121—38)

This invention relates to fabric pressing machines and particularly to control means for such machines as garment and ironing presses.

The pressing elements or press jaws of power operated pressing machines come together with great pressure and many operators have been injured by having the press close before they remove their hands from between the pressing elements. Various means have been devised to render pressing machines more safe and to prevent such injuries. The common safety means now employed is some form of two-hand control which requires the operator to use both hands to effect a closing of the press and thus insures against the operator closing the press while one hand is still between the pressing elements. Two-hand control devices have greatly lessened the danger from pressing machines, but with such safety means it is possible for a second person standing near the operator be injured by the pressing machine. In many instances the two-hand control mechanism is put out of order, either accidentally or maliciously, and it becomes possible for an operator to use one hand to close the press, thus slightly increasing the speed at which work may be performed and greatly increasing the hazard of injury.

The principal object of this invention is to provide means for controlling the closing of a pressing machine and to operate these means through light sensitive control mechanism which will not permit the press to close so long as the opertaor, or any other person, is close enough to the pressing elements or press jaws to be injured thereby.

A further object of the invention is to provide control means, including light sensitive means, for closing a pressing machine which will operate automatically to close the press when the operator steps out of reach of the pressing elements. Other objects and advantages will appear and will be pointed out as the description proceeds.

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 fragmentary view in perspective, of a pressing machine to which my invention is applied.

Figure 2 is a side elevation of a pressing machine such as illustrated in Figure 1.

Figure 3 is a schematic showing, mostly in section, of the control mechanism of the pressing machine shown in Figures 1 and 2.

Figure 4 is a sectional view of a portion of the control mechanism of the press shown in Figures 1 and 2.

Figure 5 is a schematic showing, mostly in section, of a modification of the control mechanism shown in Figure 3.

My invention is designed primarily for use with pressing machines having an opening and closing movement. A pressing jaw or head 11 is secured to a yoke 12 which is pivotally mounted at 13 on a pressing machine frame 14. The pressing head 11 is movable toward and from a fixed pressing element, jaw or buck 15 which is supported by a neck 16 mounted on the pressing machine frame 14. A fluid motor 18 is oscillatably mounted at 19 on the pressing machine frame 14 and is provided with a piston rod 20 which is pivotally connected at 21 with a bell crank 23. The bell crank 23 is pivotally mounted at 24 on the pressing machine frame 14. A connecting link 25 is pivotally connected at 26 to the yoke 12 and at 27 to the bell crank 23. The link 25 and the upstanding arm of the bell crank 23 form a toggle which is broken when the press is open. Operation of the fluid motor 18 moves the piston rod 20 to rock the bell crank 23 and move the toggle into straightened position to bring the pressing element 11 into contact with the buck 15 to close the press. A spring 30 is connected at its upper end to the pressing machine frame 14, and at its lower end to the bell crank 23. The spring 30 normally holds the press in open position. The mechanism thus far described is of the conventional type and the present invention can readily be used in connection with any type of fabric or garment press.

The motor 18 comprises a cylinder 32 having a piston 33 movable therein. The piston 33 is rigidly connected to the piston rod 20. Working fluid passes to and from the cylinder 32 through a pipe 35 which connects with the cylinder 32 at one end and connects at the other end with a relief valve housed in a valve casing 36 (see Figure 3).

The valve casing 36 contains a normally closed intake valve 40 and a normally open exhaust valve 41 which are connected together by a spacer rod 42 so that they operate as a unit. A spring 43 holds the valves 40 and 41 in normal position. The exhaust valve 41 is formed with a valve stem 44 which projects through the end of the valve casing 36. A rocker arm 45 is pivoted at 46 to a bracket on the valve casing 36 and

rocking movement of the rocker arm 45 in a clockwise direction, in Figure 3, about the pivotal connection 46 moves the valve stem 44 to operate the valves in the valve casing 36 to open the intake valve 40 and close the exhaust valve 41. When the exhaust valve 41 is open, working fluid in the valve casing 36 will escape through the exhaust port 47. Working fluid is supplied to the valve casing 36 through a pipe 48.

The supply of working fluid to the pipe 48 is controlled by the valves in the valve casing 49. The valve casing 49 contains a normally closed intake valve 50 and a normally open exhaust valve 51 which are connected together by a spacer rod 52 so that they operate as a unit. A spring 53 holds the valves 50 and 51 in normal position. The exhaust valve 51 is formed with a valve stem 54 which projects through the end of the valve casing 49. A rocker arm 55 is pivoted at 56 to a bracket formed on the valve casing 49. Rocking movement of the rocker arm 55 in a counterclockwise direction, in Figure 3, moves the valve stem 54 to operate the valves in the valve casing 49 to open the intake valve 50 and close the exhaust valve 51. A handle 60 is connected with the rocker arm 55 to provide means by which the operator may actuate the rocker arm 55. A diaphragm chamber 62 is formed in the upper part of the valve casing 49 and contains a diaphragm 63. A plunger 65 extends through the end of the diaphragm chamber 62 and when pressure is applied behind the diaphragm 63 the plunger 65 will be moved into contact with the rocker arm 55 to hold the same in operated position. A pipe 67 connects the diaphragm chamber 62, at a point behind the diaphragm 63, with the pipe 35.

Electro-magnetic means are provided to operate the valves in the valve casing 36. These electro-magnetic means include a solenoid 70 and an armature 72. The armature 72 may be connected to the rocker arm 45 by any suitable means. As illustrated, the armature 72 passes through a hole 74 formed in the rocker arm 45. The armature 72 fits loosely in the hole 74 and the end of the armature 72 is enlarged so that it cannot pull through the hole 74. The sides of the hole 74 may be rounded to prevent binding of the armature 72 as a result of the oblique pull of the armature 72.

The solenoid 70 is connected by a conductor 76 with the main power line and a conductor 78 connects the solenoid 70 with a contact point 80 of a normally open relay 82. When the relay 82 is operated, in a manner later to be described, an armature 83 of the relay is drawn into contact with the contact point 80 to provide a ground connection for the solenoid 70 through the conductor 78, contact point 80, armature 83, and a conductor 85, which connects with the main power line.

The relay 82 is connected in series with light sensitive means such as photo-electric cells 90, 91 and 92. The photo-electric cell 90 is connected to a conductor 95 which leads from the main power line. A conductor 96 connects the photo-electric cells 91 and 92 and a conductor 96^a connects the photo-electric cells 90 and 91. The photo-electric cell 92 is connected by a conductor 97 with one terminal of the relay 82. The other terminal of the relay 82 is grounded through a conductor 98 which leads to the main power line.

Light sources are supplied to illuminate the photo-electric cells in order to render them conductors of electricity. A light source such as an incandescent electric light 100 is connected to the power supply line and is mounted in a container 102. The container 102 is provided with an opening 104 through which a beam of light passes from the incandescent light 100 to the photo-electric cell 92. An opening 106 permits a beam of light from the incandescent light 100 to pass to the photo-electric cell 90. A source of light comprising an incandescent light 108 is mounted in a box 109 which is provided with an opening 110 through which a beam of light is thrown to the photo-electric cell 91.

A shutter 112 is provided for cutting off the light supplied to the photo-electric cell 90. The operation and purpose of this shutter will be described hereinafter.

The photo-electric cells 90, 91 and 92 and the light sources including the boxes 102 and 109 are mounted on standards 115 which extend upwardly from a table 118 secured to the pressing machine frame 14. Referring to Figure 1 it will be noted that the beams of light between the light sources and the photo-electric cells form, in effect, a fence or barrier around three sides of the pressing elements and these beams of light are preferably spaced sufficient distance from the pressing elements so that it is impossible for a person to come within reach of the pressing elements without intercepting one of the beams of light. The beams are so spaced from the pressing elements that an operator standing near the press to place work thereon, will intercept the beam of light which extends across the front of the pressing machine. No light beam is shown projected across the back of the pressing machine since it is conventional practice to place a pressing machine close to a wall or other obstruction, and it is therefore impossible for a person to approach the press from such direction.

Presses of the kind shown herein have a table 118 under the buck 15 for supporting such parts of fabrics or garments as overhang the buck. This table will extend well out from the press and a recess 141 is provided directly in front of the press. From this recess the operator can easily reach all parts of the buck, but at other positions the table makes it impossible or awkward and inconvenient to reach between the jaws. The operator, therefore, must stand in the recess 141 in the table 118 in order to place on or remove from the buck material to be pressed. The operator, therefore, cannot defeat the safety beam by attempting to operate the machine at a point not traversed by the beam.

From the description thus far it will be apparent that if no shadow is cast on the photo-electric cells the solenoid 70 will hold the intake valve 40 open and the exhaust valve 41 closed. With the valves in the valve casing 36 thus held in operated position by the solenoid 70 the press may be closed by actuating the handle 60 to open the intake valve 50 and close the exhaust valve 51 in the valve casing 49. When the intake valves 50 and 40 are both open, working fluid from the fluid supply line 140 will pass through the valve casing 49, pipe 48, valve casing 36, and pipe 35 to the fluid motor 18 to operate the same to close the press.

The shutter 112 is carried by an arm 114 which is pivotally supported at 116 on a bracket. A spring 117 normally holds the arm 114 and shutter 112 down and out of the path of the beam of light which illuminates the photo-electric cell 90. The arm 114 is operated, to move the

shutter 112, by a plunger 120 which extends through the top of a diaphragm chamber 122 which contains a diaphragm 124. Working fluid is supplied through a pipe 125 to the diaphragm chamber 122 and the pressure of such working fluid behind the diaphragm 124 operates the plunger 120 to raise the arm 114 to move the shutter 112 into position to cast a shadow on the photo-electric cell 90. The supply of working fluid to the pipe 125 is controlled by valves in a valve casing 128. The valve casing 128 contains a normally closed intake valve 130 and a normally open exhaust valve 131 which are connected together by a spacer rod 132 so that they operate as a unit. A spring 133 holds the valves 130 and 131 in normal position. The exhaust valve 131 is formed with a valve stem 134 against which a handle 135 operates to move the valves in the valve casing 128 into operated position to open the intake valve 130 and close the exhaust valve 131. Working fluid is supplied to the valve casing 128 through a fluid supply line 137.

No means are provided to lock the valves in the valve casing 128 in operated position and as soon as the operator releases the handle 135 the intake valve 130 will close and the exhaust valve 131 will open thus releasing the pressure under the diaphragm 124 and permitting the shutter 112 to return to normal position. Although the shutter 112 does not remain in position to shut off the light from the photo-electric cell 90, the momentary shadow on this photo-electric cell 90 is sufficient to cause the press to open and remain in open position. Any passing shadow on the photo-electric cell 90 will cause an interruption in the power supplied to the relay 82 and the armature 83 will move away from the contact 80 to break the circuit to the solenoid 70. With the solenoid 70 no longer energized, the spring 43 will close the intake valve 40 and open the exhaust valve 41. Working fluid in the diaphragm chamber 62 will escape through the pipes 67 and 35, past the open exhaust valve 41, and through the exhaust port 47. When the pressure behind the diaphragm 63 is thus reduced the spring 53 will close the intake valve 50 and open the exhaust valve 51. So long as the shadow remains on the photo-electric cell 90, working fluid in the cylinder 32 will exhaust through the pipe 35, valve casing 36, past the open exhaust valve 41 and through the exhaust port 47. When light again falls on the photo-electric cell 90, as for example when the shutter 112 returns to normal position, the solenoid 70 will again be energized and the valves in the valve casing 36 operated to open the intake valve 40 and close the exhaust valve 41. The opening movement of the press will not be effected by this renewal of the power supply to the solenoid 70 since the working fluid in the cylinder 32 may exhaust through the pipe 35, valve casing 36, around the open intake valve 40, through the pipe 48, and valve casing 49, past the open exhaust valve 51.

When the press is closed and the operator approaches the pressing elements, he will intercept the beam of light which illuminates the photo-electric cell 90 and the valves in the valve casing 36 will be operated, in a manner to be described in detail hereinafter, to cause the press to open. When the operator works on two or more machines some saving in time may be effected by mounting the valve casing 128 and the control handle 135 on another machine so that as the operator leaves such machine to walk over to the machine shown in the drawings, the shutter 112 will be operated to cast a shadow on the photo-electric cell 90 to cause the press to open before the operator reaches it.

Figure 5 shows a modified form of control mechanism in which the opening and closing of the press operates automatically without the necessity of any manual control by the operator. For example, the press will automatically close whenever the operator steps out of the beam of light which illuminates the photo-electric cell 90 and the press will again open when the photo-electric cell is in shadow, as for example when the operator returns to position intercepting the beam of light which illuminates the photo-electric cell 90. The electrical control mechanism shown in Figure 5 is identical with that shown in Figure 3 and is indicated by the same reference characters. The control valves in the valve casing 36 are also identical with those shown in Figure 3 but some change is made in the piping which connects with the valve casing 36. A pipe 150 connects the valve casing 36, at a point midway between the valves 40 and 41, with the cylinder 32 of the fluid motor 18. Working fluid is supplied to the valve casing 36 through a fluid supply line 152 and a rotary valve 154 is inserted in the fluid supply line 152 and may be operated by a handle 155 to cut off the supply of working fluid through the fluid supply line 152. The rotary valve 154 is used only when it is desirable to render the electrical control mechanism inoperative. In the ordinary routine operation of the press, by the modified control mechanism shown in Figure 5, the operator will never use the valve 154 but will leave it in open position. There may be times when the operator will leave the press but will want the press to remain open. If the operator steps away from the press to get new work he may prevent the press from closing by moving the handle 155 to close the rotary valve 154 and the electrical control mechanism will be rendered inoperative to close the press since the supply of working fluid to the valve casing 36 is cut off.

The operation of the machine is as follows (Figure 3):

Before starting the operation of the machine the operator will light the incandescent lamps 100 and 108 to throw beams of light on the photo-electric cells 90, 91 and 92, as previously described. The valves in the valve casing 49 will be in normal position with the intake valve 50 closed and the exhaust valve 51 open. After the operator has stepped into position to place the work on the press, the beam of light which illuminates the photo-electric cell 90 will be cut off and the shadow of the operator on the photo-electric cell 90 will so reduce the current flowing through the photo-electric cells and the relay 82 that the armature 83 will return to normal position out of contact with the contact point 80. The circuit through the solenoid 70 will therefore be broken and the spring 43 will hold the valves 40 and 41, and the rocker arm 45 and armature 72, in inoperative position, as shown in Figure 3.

After the operator has arranged the work on the buck he will step back from the pressing machine and his shadow will no longer cut off the beam of light which illuminates the photo-electric cell 90. As soon as the beam of light from the incandescent lights 100 and 108 falls on the photo-electric cells, current will flow through the

photo-electric cells 90, 91 and 92 and the relay 82 to energize the relay and draw the armature 83 into contact with the contact point 80. As soon as the armature 83 makes contact with the contact point 80, current will flow through the solenoid 70, through the circuits previously described, to energize the solenoid 70 and draw the armature 72 into the solenoid 70 to move the rocker arm 45 and operate the valves in the valve casing 36. When the valves in the valve casing 36 are thus operated, the intake valve 40 will be moved into open position and the exhaust valve 41 into closed position. The operator may now actuate the handle 60 to open the intake valve 50 and close the exhaust valve 51. Working fluid from the fluid supply line 140, will flow around the open intake valve 50, through the valve casing 49, pipe 48, around the open intake valve 40, through the valve casing 36, and pipe 35 to the cylinder 32 of the fluid motor 18 to operate the piston 33 and piston rod 20 to close the press. Working fluid from the pipe 35 will flow through the pipe 67 to the diaphragm chamber 62 and the pressure thus exerted behind the diaphragm 63 will move the plunger 65 into contact with the rocker arm 55 and lock the valves 50 and 51 in operated position so that it is not necessary for the operator to hold the handle 60.

The beam of light from the incandescent light 100 to the photo-electric cell 90 is so spaced from the front of the pressing machine that the operator cannot reach the pressing elements after he has stepped out of the beam of light. If the operator approaches the press, during the closing movement, as for example to smooth out a wrinkle in the work, his shadow will again be thrown on the photo-electric cell 90 and the current through the photo-electric cells 90, 91 and 92 and the relay 82 will drop so that the armature 83 will move away from the contact point 80 and break the circuit through the solenoid 70. Any time that the circuit through the solenoid 70 is broken, the spring 43 will return the valves 40 and 41 to normal position with the intake valve 40 closed and exhaust valve 41 open, thus cutting off the supply of working fluid to the motor 18 and permitting the working fluid in the motor 18 to exhaust through the pipe 35, valve casing 36, and past the open exhaust valve 41, through the exhaust port 47. At the same time working fluid in the diaphragm chamber 62 will exhaust through the pipes 67 and 35, valve casing 36, past the open exhaust valve 41, and through the exhaust port 47. When the pressure behind the diaphragm 63 is thus reduced, the spring 53 will close the intake valve 50 and open the exhaust valve 51. From the above description it is apparent that the press cannot be closed so long as any one is standing within the danger zone, that is, close enough to the press to place a hand between the pressing elements. It will be further apparent that the press may be closed by actuating the handle 60 after the operator steps outside of the danger zone, but that such closing movement will immediately stop and the press will again open if any one steps within the danger zone.

While the press is closed, it is conventional practice for the operator to work at another machine. When the operator returns from the other press and intercepts the light which illuminates the photo-electric cell 90, the press will immediately open, as previously described. Even though this opening is at a rapid rate some little time will be lost waiting for the press to open and this time may be saved if the operator can actuate remote control means on another press, which will cause the first press to open while he is returning to it. The valves in the valve casing 128 provide such remote control means and before leaving the other machine the operator will actuate the handle 135 to operate the valves in the valve casing 128 to open the intake valve 130 and close the exhaust valve 131. Working fluid from the fluid supply line 137 will flow around the open intake valve 130, through the valve casing 128, and pipe 125, to the diaphragm chamber 122 to operate the diaphragm 124 which will move the plunger 120 to raise the arm 114 and shutter 112 into position to intercept the beam of light which illuminates the photo-electric cell 90. The shadow of the shutter 112 on the photo-electric cell 90 will cause the press operating mechanism to open the press in exactly the same manner as would the shadow of the operator on the photo-electric cell 90. As soon as the operator releases the handle 135 the spring 133 will close the intake valve 130 and open the exhaust valve 131. The working fluid in the diaphragm chamber 122 will escape through the pipe 125, valve casing 128, and past the open exhaust valve 131. When the pressure behind the diaphragm 124 is thus reduced the spring 117 will move the shutter 112 back into normal position outside of the beam of light which illuminates the photo-electric cell 90. While the shadow cast on the photo-electric cell 90 by the shutter 112 is of short duration, it is sufficient to cause the press to open, as previously described.

The operation of the control mechanism shown in Figure 5 is as follows:

When the operator wishes to render the electrical control mechanism operative, he will open the valve 154 to supply working fluid through the pipe 120 to the valve casing 36. While the operator is standing in front of the press arranging work, his shadow will be cast on the photo-electric cell 90 and the current flowing through the relay 82 will not be sufficient to attract the armature 83 into engagement with the contact point 80. The circuit of the solenoid 70 will therefore be incomplete and no current will flow through the solenoid 70. The spring 43 will hold the valves in the valve casing 36 in their normal position with the intake valve 40 closed and the exhaust valve 41 open.

When the operator has arranged the work on the buck he will step back out of the beam of light which illuminates the photo-electric cell 90 and the current through the photo-electric cells and relay 82 will increase so that the relay will attract the armature 83 into engagement with the contact point 80 and close the circuit through the solenoid 70. When the solenoid 70 is thus energized the armature 72 will be operated to move the rocker arm 45 and open the intake valve 40 and close the exhaust valve 41. Working fluid from the fluid supply line 152 will flow around the open intake valve 40, through the valve casing 36, and pipe 150 to the cylinder 32 of the fluid motor 18 to operate the same to close the press.

If the operator steps within the beam of light which illuminates the photo-electric cell 90, either during the closing movement of the press or after the press has closed, the press will immediately open since the current through the relay 82 will be reduced and the armature 83 will move away from the contact point 80 thus breaking the circuit through the solenoid 70 and

permitting the spring 43 to close the intake valve 40 and open the exhaust valve 41. The closing of the intake valve 40 cuts off the supply of working fluid to the motor 18 and the opening of the exhaust valve 41 permits working fluid to escape from the cylinder 32 through the pipe 150, valve casing 36, past the open exhaust valve 41, and through the exhaust port 47.

From the foregoing description it will be apparent that I have devised a novel safety control means for a pressing machine which will prevent the closing of the press so long as the operator, or any other person, is standing within the danger zone of the press. It will be further apparent that I have devised modified control means by which the press will be automatically closed and opened when the operator steps away from the press or returns to the press, respectively.

The invention is illustrated in its preferred embodiment but changes and modifications may be made without departing from the spirit of the invention, as set forth in the appended claims.

What I claim is:

1. In a pressing machine comprising, in combination, cooperative pressing elements adapted to open and close on the work; operating mechanism for opening and closing the press; control means for the operating mechanism including, a light sensitive means mounted adjacent the pressing machine, and means projecting a beam of light upon the light sensitive means in a direction to be obstructed by an operator when placing work in position; and a shutter adjacent the light sensitive means for obstructing the beam of light and casting a shadow on said light sensitive means thereby causing the press to open.

2. In a pressing machine in combination, cooperative pressing elements adapted to open and close on the work; operating mechanism to open and close the pressing machine; control means for the operating mechanism including light sensitive means mounted adjacent the pressing elements; a shutter for casting a shadow on the light sensitive means; and remote control means for operating the shutter to move the same.

3. A pressing machine comprising in combination, cooperative pressing elements adapted to open and close on the work; operating mechanism to open and close the pressing machine; control means for the operating mechanism including light sensitive means mounted adjacent the pressing elements; a shutter; remote control means for controlling the operation of said shutter to move the same into position to cast a shadow on the light sensitive means; and control means adjacent the pressing elements to restore the shutter to its original position out of the path of the light illuminating the light sensitive means.

4. In a garment pressing machine in combination, cooperative pressing elements adapted to open and close on the work; operating mechanism for opening and closing the pressing machine; light sensitive means adjacent the pressing elements and located in position so that an operator standing close to the press will cast a shadow on the light sensitive means; means, controlled by the light sensitive means, for controlling the operating mechanism to open the press when a shadow is cast on the light sensitive means; and remote control means for cutting off the light to said light sensitive means.

5. A pressing machine having press jaws and a safety device, comprising in combination, a fluid motor to open and close the pressing machine, a conduit to supply fluid pressure to said motor, a relief valve in said conduit which relief valve in open position renders said motor inoperative to close the press jaws; an electric circuit including in series therewith, a photo-electric cell, and means for opening and closing said relief valve, said means being actuated to close the relief valve by illumination of the photo-electric cell and to open the valve when said illumination is intercepted; and means to cast a beam of light on said photo-electric cell to illuminate it, said beam having such spaced relation to the press jaws that an operator cannot reach between said jaws without intercepting the beam of light and thereby operating the relief valve and rendering the fluid motor inoperative.

6. A pressing machine having closable pressing jaws in combination with an electric circuit providing a safety control for the pressing machine, the jaws of said pressing machine being closable only when said electric circuit is closed and automatically opened upon the opening of said electric circuit, a photo-electric cell in series with said electric circuit, and means to cast a beam of light upon the cell which when illuminated renders the circuit substantially closed, said circuit being substantially open upon interception of the beam of light, the beam of light having such spaced relation to the jaws of the pressing machine that an operator cannot reach said jaws without intercepting said beam and thereby causing said electric circuit to open.

7. A machine and safety device therefor comprising an electric circuit which when closed renders the machine operable, and when open renders the machine inoperable, said circuit comprising a light sensitive electric cell which upon illumination by a beam of light closes said circuit and permits sufficient current to flow through said circuit to render said machine operable and upon interception of said beam substantially opens said circuit and renders said machine inoperable, illuminating means to cast a beam of light upon said light sensitive element, the geometrical relation between the machine, the light sensitive element, and the said illuminating means being such that the said beam of light acts in effect as a guard for the machine, the interception of said beam of light by the operator of the machine substantially opening the said electric circuit and rendering the machine inoperable.

8. A pressing machine and safety device therefor, comprising, in combination, cooperative pressing elements and a fluid motor, the said elements being arranged to be closed by the application of fluid to said motor and to be opened upon the release of fluid from said motor, a conduit to supply fluid to said motor, a first valve in said conduit which when open delivers fluid to said motor to close the pressing elements and when closed prevents access of fluid to said motor and releases fluid therefrom to open said pressing elements, a second valve in said conduit to control the supply of fluid to said first valve, an electric relay circuit which circuit when closed opens said first valve and when open closes said valve, said circuit comprising a light sensitive element which upon illumination by a beam of light permits sufficient current to flow through said circuit to substantially close the

same and upon interception of said beam substantially opens said circuit, illuminating means to cast a beam of light upon said light sensitive element, the geometrical relation between the machine, light sensitive element and illuminating means being such that the said beam acts in effect as a guard for the machine.

9. A garment or ironing press having press jaws and a safety device comprising, in combination, a fluid motor to open and close the press, a conduit to supply fluid pressure to said motor, a relief valve in said conduit which relief valve in operated position controls the actuation of the motor to close the press jaws, an electric circuit, including in series a photo-electric cell, and means for moving said relief valve to operative and inoperative positions, said means being actuated to operate the relief valve into operative position to open the jaws by illumination of the photo-electric cell and to move the valve to inoperatie position when said illumination is intercepted, and means to cast a beam of light on said photo-electric cell to illuminate it, said beam haing such spaced relation to the press jaws that an operator cannot reach between said jaws without intercepting the beam of light and thereby rendering the fluid motor inoperative.

10. A garment or ironing press having press jaws and a safety device comprising, in combination, motor means to open and close the press, a conduit to supply working fluid to said motor means, an operator actuated valve in said conduit, and a relief valve in said conduit which relief valve in operated position controls the actuation of the motor means to close the press jaws, an electric circuit, including in series a photo-electric cell, and means for moving said relief valve to operative and inoperative positions, said means being actuated to operate the relief valve into operative position to open the jaws by illumination of the photo-electric cell and to move the valve to inoperative position when said illumination is intercepted, and means to cast a beam of light on said photo-electric cell to illuminate it, said beam having such spaced relation to the press jaws that an operator cannot reach between said jaws without intercepting the beam of light and thereby rendering the fluid motor inoperative.

11. A pressing machine having press jaws and a safety device comprising, in combination; a fluid motor to open and close the press; a conduit to supply fluid pressure to said motor; a relief valve in said conduit including a combined intake and exhaust valve, the relief valve in operated position closing the exhaust valve and opening the intake valve to control the actuation of the motor and in inoperative position controlling the exhausting of the motor and the opening of the press jaws; an electric circuit including in series a photo-electric cell, and means for opening and closing said relief valve, said means being actuated to operate the relief valve into operative position by illumination of the photo-electric cell and into inoperative position when said illumination is intercepted; means to cast a beam of illumination on said photo-electric cell, said beam having such spaced relation to the press jaws that an operator cannot reach between said jaws without intercepting the beam and thereby opening the exhaust valve and exhausting the fluid pressure from the fluid motor; and an operator actuated intake valve connected in series with the combined valve.

12. A pressing machine having press jaws and a safety device comprising, in combination; a fluid motor to open and close the press; a conduit to supply fluid pressure to said motor; a relief valve in said conduit including a combined intake and exhaust valve, the relief valve in operated position closing the exhaust valve and opening the intake valve to control the actuation of the motor and in inoperative position controlling the exhausting of the motor and the opening of the press jaws; an electric circuit including in series a photo-electric cell, and means for opening and closing said relief valve, said means being actuated to operate the relief valve into operative position by illumination of the photo-electric cell and into inoperative position when said illumination is intercepted; means to cast a beam of illumination on said photo-electric cell, said beam having such spaced relation to the press jaws that an operator cannot reach between said jaws without intercepting the beam and thereby opening the exhaust valve and exhausting the fluid pressure from the fluid motor; an operator actuated intake valve connected in series with the combined valve; pressure operated holding means for retaining the latter intake valve open; and a connection from the motor to the holding means.

13. A garment or ironing press comprising, in combination coopearting pressing jaws adapted to open and close on the work; a fluid motor to open and close the press; control valve means controlling the actuation of the fluid motor including an operator actuated valve, safety means preventing a flow of fluid to the fluid motor, an electric circuit including in series a photo-electric cell, means for moving said safety means to operative and inoperative positions, said means being actuated to move the safety means into operative position to cause closing of the jaws by illumination of the photo-electric cell and to move the safety means to inoperative position when said illumination is intercepted, means to cast a beam of light on said photo-electric cell to illuminate it, said beam having such spaced relation to the press jaws that an operator cannot reach between said jaws without intercepting the beam of light and thereby returning the safety means to inoperative position; and holding means retaining the operator actuated valve in open position and operated upon movement of the safety means into operative position.

14. A garment or ironing press comprising, in combination, cooperating pressing jaws adapted to open and close on the work; a fluid motor to open and close the press; control valve means controlling the actuation of the fluid motor including an operator actuated valve, a second valve between the operator actuated valve and the fluid motor, an electric circuit including in series a photo-electric cell, means for moving said second valve to operative and inoperative positions, said means being actuated to move the second valve into operative position to close the jaws by illumination of the photo-electric cell and to move the second valve to inoperative position when said illumination is intercepted, means to cast a beam of light on said photo-electric cell to illuminate it, said beam having such spaced relation to the press jaws that an operator cannot reach between said jaws without intercepting the beam of light and thereby returning the second valve to inoperative position, and means operated to hold the press in closed position upon movement of the second valve into operative position.

15. A garment or ironing press comprising, in combination, cooperating pressing jaws adapted to open and close on the work; a fluid motor to

open and close the press; control valve means controlling the actuation of the fluid motor including an operator actuated valve, a second valve between the operator actuated valve and the fluid motor, an electric circuit including in series a photo-electric cell, means for moving said second valve to operative and inoperative positions, said means being actuated to move the second valve into operative position to close the jaws by illumination of the photo-electric cell and to move the second valve to inoperative position when said illumination is intercepted, means to cast a beam of light on said photo-electric cell to illuminate it, said beam having such spaced relation to the press jaws that an operator cannot reach between said jaws without intercepting the beam of light and thereby returning the second valve to inoperative position, and holding means retaining the operator actuated valve in operated position and operated upon movement of the second valve into operative position.

16. A garment or ironing press comprising, in combination, cooperating pressing jaws adapted to open and close on the work; a fluid motor to open and close the press; control means controlling the actuation of the fluid motor including an operator actuated intake valve, a second intake valve between the operator actuated valve and the fluid motor, an electric circuit including in series a photo-electric cell, means for moving said second valve to open and closed positions, said means being actuated to move the second valve into open position to close the jaws by illumination of the photo-electric cell and to move the valve to closed position when said illumination is intercepted, means to cast a beam of light on said photo-electric cell to illuminate it, said beam having such spaced relation to the press jaws that an operator cannot reach between said jaws without intercepting the beam of light and thereby returning the second valve to closed position, and air pressure means retaining the operator actuated intake valve in open position and connected between the second valve and the motor.

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