

[54] **PUNCH PRESS WITH SWING-OUT CONTROL PANEL**

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 [58] Field of Search .....100/53, 99; 18/30 CS, DIG. 45;  
 83/68, 397, 544, 547; 192/129 A; 74/612-616

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[57] **ABSTRACT**

A control panel is hinged to swing like a door outwardly from the front of the frame away from the ram in order for the setup man or maintenance man to have clear access to all the press, ram, screw, and bed area for repairing or setting up the press, this control panel, for safety reasons, having a main disconnect switch incorporated therein with electric wires running inside the panel and thence through the frame at the hinged end of the panel to a main control box, the entire wired track being fully insulated. This main disconnect switch is opened automatically under spring pressure when the control panel is swung away from the frame when the control panel is swung back and locked in its normal position. In that way all electrical connections and all air connections are disconnected automatically when the panel is swung outwardly, completely eliminating any possible mechanical or electrical mishap befalling the setup man or operator, as the machine is completely immobilized under these conditions. The control panel carries die lights on the inner side thereof for good illumination of the entire bed area to facilitate repairing and setup jobs, the panel serving as a reflector for these lights. A hinged cover plate on the front of the panel facilitates all of the assembling and wiring operations at the outset, besides affording easy access to everything carried in the panel whenever that may become necessary.

10 Claims, 7 Drawing Figures

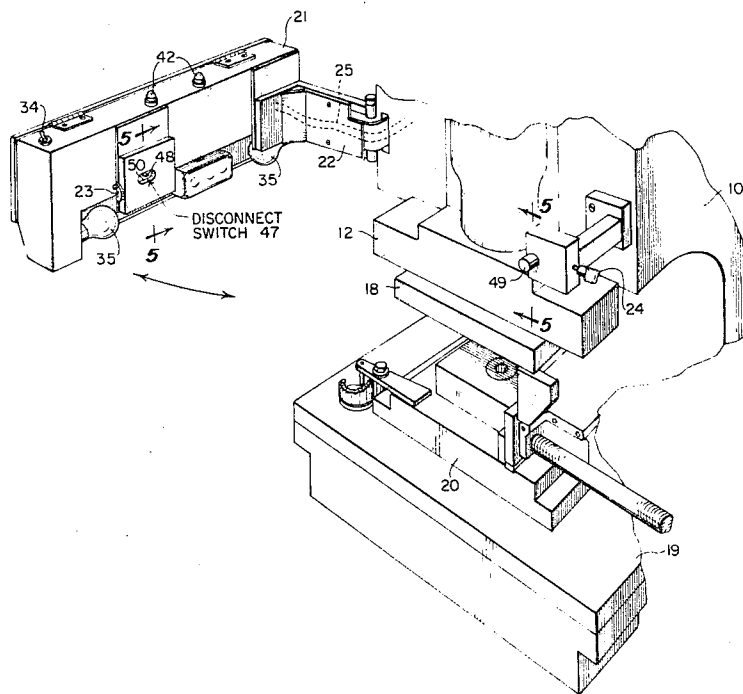


FIG 1

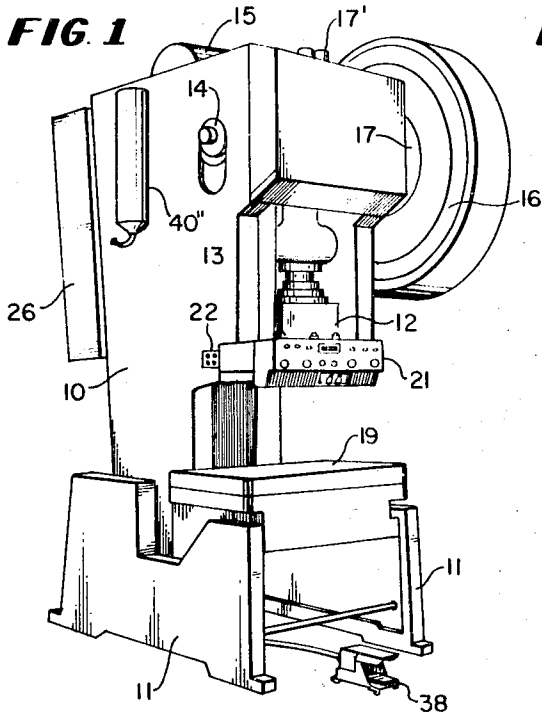


FIG 2

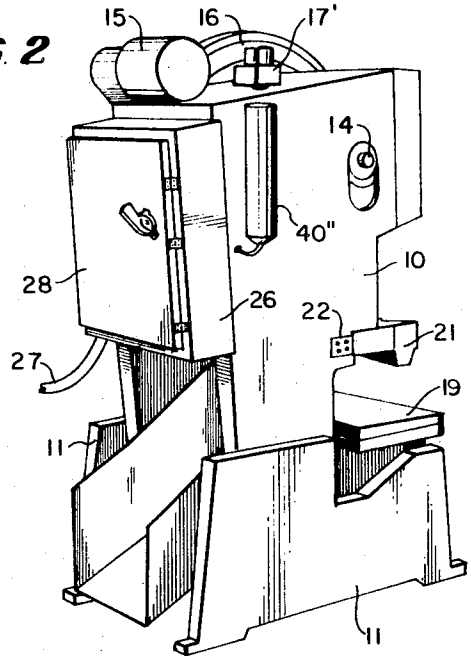
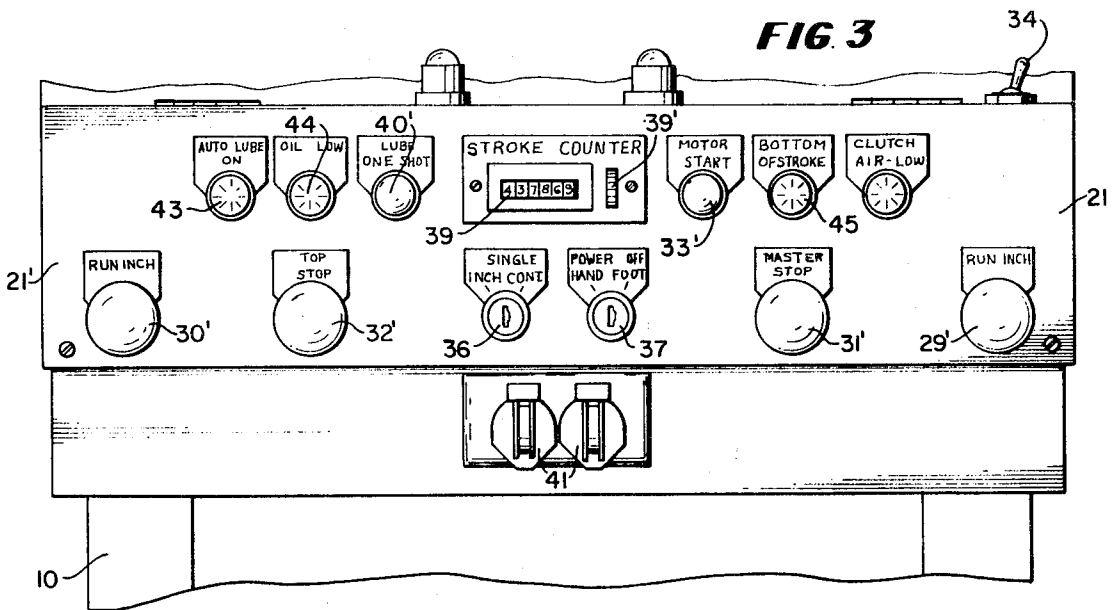


FIG 3



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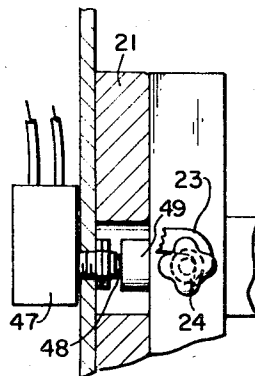
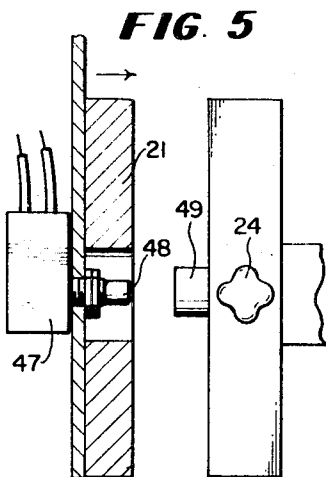
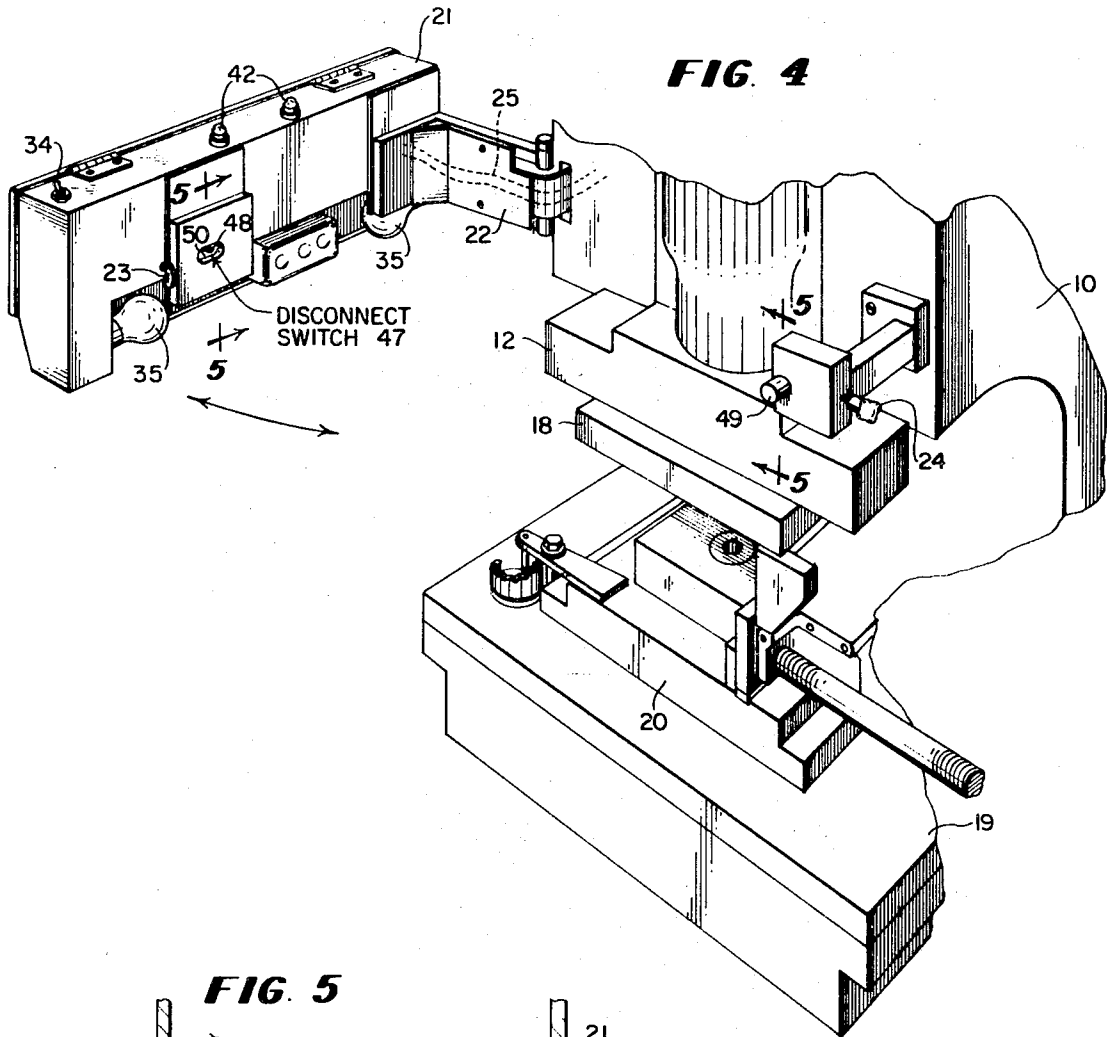


FIG 6

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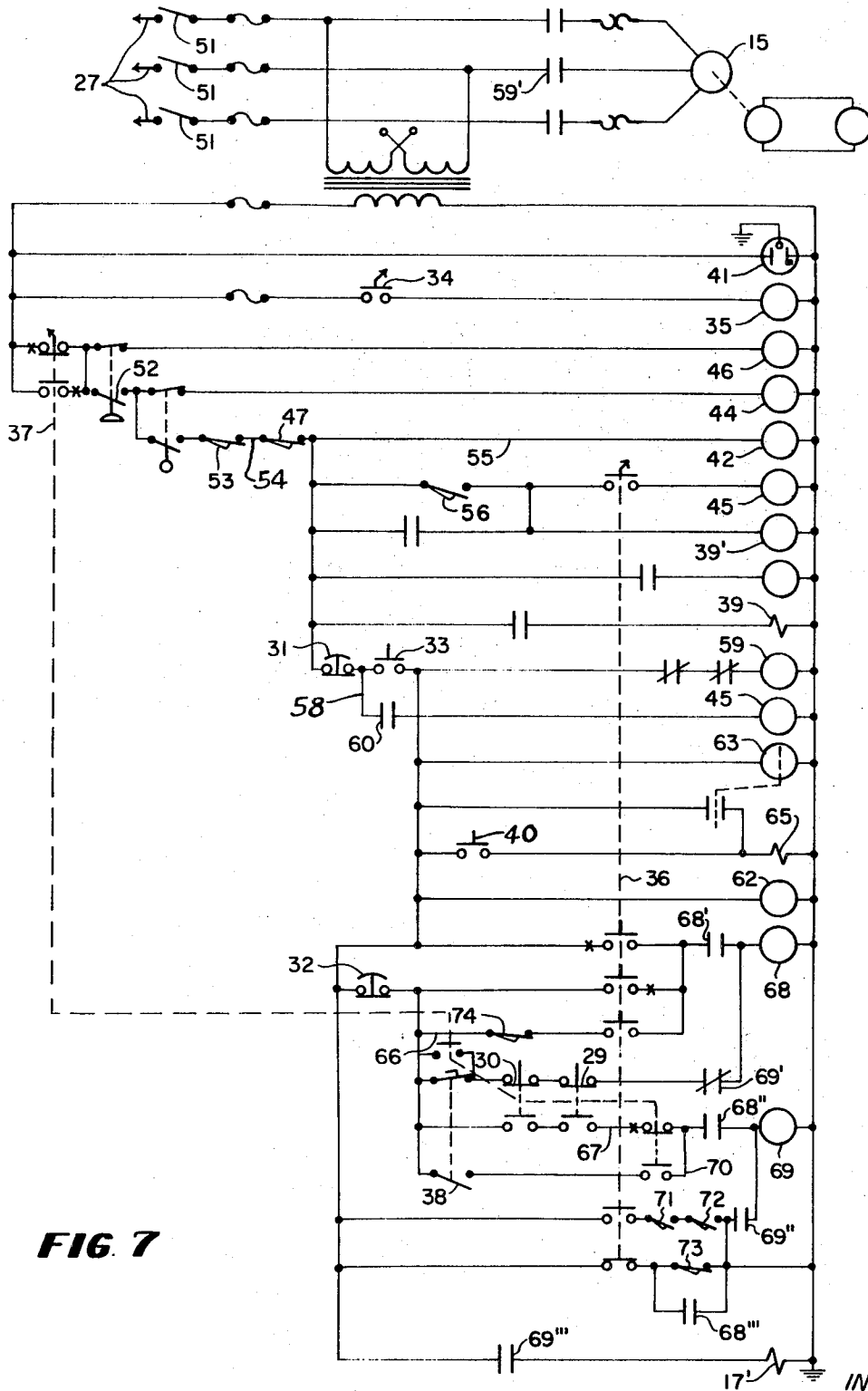


FIG 7

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## PUNCH PRESS WITH SWING-OUT CONTROL PANEL

This invention relates to presses and more specifically electric motor operated presses incorporating air clutch and brake assemblies in their flywheels.

The principal object of this invention is to greatly improve the safety factor in such presses by providing a hinged front control panel designed to be swung outwardly from the frame to open a main disconnect switch automatically that is spring pressed to open circuit position but arranged to be closed positively by engagement with a projection on the frame when the panel is swung back to its normal closed position and locked detachably in that position. All of the press control switches operable manually from the front of the panel are connected in circuit with the main disconnect switch and are, therefore, all disconnected in the swinging out of this panel, completely disconnecting all electrics and air also and thereby eliminating any possible mechanical or electrical mishap befalling the setup man or operator, because the press is completely immobilized under these conditions. Also, with the panel swung out of the way, there is clear access to all of the press, ram, screw and bed area to facilitate any repairing and setup jobs, such work being made easier by the adequate lighting afforded by light bulbs carried in sockets on the inner side of the panel, using the panel as a reflector. With all electrics running concealed and with good insulation at all points from one end of the panel through the hinge and press frame to the control box on the back, nothing is left exposed on either side of the press that might be subject to damage.

The invention is illustrated in the accompanying drawings, in which:

FIG. 1 and 2 are perspective front and rear views, respectively, of a press embodying the present invention;

FIG. 3 is a front view of the control panel portion of the press;

FIG. 4 is a perspective view of the lower half portion of the press, showing the control panel swung outwardly to the safety position opening the main disconnect switch;

FIGS. 5 and 6 are vertical sections on the lines 5-5 of FIG. 4, showing the open and closed circuit positions of the parts, respectively, and

FIG. 7 is a schematic wiring diagram.

The same reference numerals are applied to corresponding parts throughout the views.

Referring first to FIGS. 1-6, the reference numeral 10 designates the upright frame of the press supported on laterally spaced legs 11 and having the usual parallel guides for the vertically reciprocable slide or ram 12 that is operated in the usual way by a connecting rod 13 from an intermittently driven single turn crankshaft 14. An electric motor 15 supplies the power for the press and drives a flywheel 16 continuously, while an air clutch and brake assembly 17 in the flywheel connected with a source of compressed air supply for operation through an electrically operable solenoid valve 17', serves when engaged to transmit drive from the flywheel 16 to the crankshaft 14. The brake assures instant stopping in case of either electrical or air supply failure, so, of course, when the control panel to which reference is to be made soon is swung outwardly to open circuit safety position, the brake is applied automatically. The slide 12 carries a die 18 for whatever job is being done, and the die in each stroke moves down to a predetermined spaced relationship to the bolster 19 and mating die 20. The control panel 21, which is the salient feature of my invention, is hinged at one end, as at 22, on a vertical axis relative to one side of the front of the frame 10 and is arranged to be latched in closed position by a vertically swingable C-washer latch 23 pivoted to the outer end of the panel 21 and connectable through its slot with keeper screw 24 provided on the frame and adapted to be tightened and loosened by hand.

The control panel has a flexible electrical conduit 25 extending in safely insulated relationship from its hinged end through openings in the hinge 22 and frame 10 to a switch box 26 carried on the back of the frame, the box having an electrical power cable 27 extending therefrom to an electrical power

source. A door 28 affords access to the box 26. All of the wires connecting switches and lights, etc., on the panel 21 with their power sources in the switch box extend from the flexible conduit 25 in safely insulated relationship in the panel 21 to the appropriate switches, lights, and so forth. Among the switches and other so-called "electrics" are:

1. the "run" switches 29 and 30 operable by right- and left-hand depression of right and left mushroom-type buttons 29' and 30', respectively;

2. the emergency master "stop" switch 31, operable by depression with either hand of mushroom-type button 31';

3. the "top stop" switch 32, operable by depression with either hand of another mushroom-type button 32';

4. the "motor start" switch 33 controlling the drive motor 15, operable by depression with either hand of another button 33';

5. the "on-off" toggle switch 34 on top of the panel 21 at the outer end for turning the 200-watt die lights 35 on or off;

6. the key lock selector switches 36 and 37, switch 36 being a three-position one for either single cycle in midposition, or "inching" or "continuous" operation of the ram 12 in the other two positions, and switch 37 being also a three-position one for "power on" in midposition, hand control in the left-hand position, and foot control with foot pedal 38 in the right-hand position;

7. the electrically operated stroke counter 39, having dial reset 39';

8. the one-shot lubricator switch 40 operable by depression with either hand of button 40' operating lubricator 40'' by remote control;

9. two 110-volt outlet receptacles or sockets 41 for attaching extension cords in servicing the press or whenever and for whatever purpose any additional electrical outlets may be needed;

10. the various signal lights:

a. the two red "power on" lights 42, two being provided parallel connected, to continue signalling in case of one burning out;

b. the green light 43 which, so long as it burns, signals satisfactory automatic lubrication of the press by lubricator 40'';

c. the red light 44 which is automatically turned on when the oil supply to lubricator 40'' runs low;

d. the amber light 45 which is turned on each time the ram reaches the bottom of its stroke, and

e. the red light 46 which is turned on automatically when the air pressure available for operation of the air clutch and brake assembly 17 drops below a safe level for any reason during operation of the press, and

11. the disconnect switch 47 through which all of the main switches 29-33 and signal lights 42-46 are automatically disconnected from the electrical power source when the panel is swung outwardly, as shown in FIG. 4, allowing the spring-pressed button 48 to move outwardly to open circuit position, as shown in FIG. 5, whereas in the closed position of the panel, shown in FIG. 6, the spring-pressed button 48 is depressed by the fixed horizontal projection 49 provided on the frame 10 in alignment with the opening 50 in the back of the panel 21 which in turn is in register with the button 48, permitting depression of the button by the projection, as shown in FIG. 6, when the panel 21 is closed and locked in that position by latch 23 and keeper 24.

In operation, therefore, the press operates in much the same fashion as other presses so long as the control panel 21 is in its normal closed position, but, when the control panel 21 is unlocked at 23-24 and swung outwardly, as shown in FIG. 4, the disconnect switch 47 is automatically thrown open by spring pressure on its button 48, disconnecting all of the electrical power to the press and therefore shutting off the air too, since that is electrically controlled through the electrically operable solenoid valve 17; and accordingly also setting the brake in the air clutch and brake assembly 17, the brake otherwise also ensuring instant stopping in case of either electrical or air supply

failure. Drop in air supply pressure is signalled during normal operation by red light 46, while the red light 44 signals when the oil supply to the lubricator 40' has run too low for continued operation. In either of those cases, the operator presses the stop button 31' to stop the operation of the press until the air difficulty is corrected or the oil level is brought up to the proper level. The front cover plate 21' on panel 21 is hinged at its upper edge to the main hollow body portion of the panel to afford easy access to the switches and wiring in the panel to facilitate assembly in the first instance and afford easy access to the inside of the panel whenever the need for that should arise. The schematic wiring diagram, FIG. 7, showing all of the switches and their connections will now be described.

Referring to FIG. 7, the switch 51 is the main power switch in control box 26, to which the power cable 27 extends. Switch 34 controlling the die lights 35 can be closed to turn these lights on if the control panel 21 is swung out for setup work. The selector switch 37 on control panel 21 is turned to select hand operation, with right- and left-hand operable push-buttons 29' and 30', or foot operation with pedal 38. If there is the correct air pressure available to the machine, the pressure switch contacts 52 will close and the red light 46 will be turned off. Light 46 coming on later signals drop in air pressure, and the operator should then check the air supply before any further operation of the press. A bumper pin on the frame of the machine (not shown), if properly screwed into its receptacle, causes the microswitch 53 to close and provide current to the line 54. Also, if the swingout control panel 21 is properly secured in closed position, the switch 47, is closed and the red pilot lights 42 are turned on to indicate power is applied to line 55. Then in each operation of the press, limit switch 56 is tripped both to count the cycles and if the selector switch 36 is in the "inch" position indicate when the bottom of the stroke is reached. Relay 39' being energized to actuate the solenoid of the stroke counter 39, once for each cycle. The emergency stop switch 31 is normally in the closed position, providing power to the line 58, so if the operator then presses the motor start button 33', closing switch 33, the amber running light 45 turns on and the motor starter relay 59 causes closing of contacts 59' energizing the drive motor 15, and, through holding contacts 60, remain closed. The time meter clock motor 62 is also energized to indicate the machine's running time, and the lubrication timer motor 63 is also energized so that at periodic intervals contacts in line 64 are closed to actuate the solenoid of lubrication pump 65. The one-shot lubrication button 40' should be depressed before startup to close switch 40 and ensure a shot of sufficient oil to the slide bearings. If the top stop switch 32 is in the normal closed position, power is supplied to the line 66 and the operator, by depressing the top stop button 32', opens switch 32 to stop the ram at the top position. The operator, by depressing the two run buttons 29' and 30', closes switches 29 and 30, supplying power to line 67. Relay 68 is energized through the normally closed run switches 29 and 30 and the normally closed contacts of the foot switch 38 or the contacts of selector switch 37 and the normally closed contacts 69' of relay 69. Relay 68 locks in through its holding contacts 68' and selector switch 36. Depending on the method of actuation (hand or foot) the operator depresses either a foot switch 38 or both palm button operated switches 29 and 30, opening the energizing circuit for relay 68 and providing power to line 70. Relay 69 is energized through the closed contacts 68'' of line 70 locking through holding contacts 69'' and either of the following depending on the position of the selector switch 36:

Cam operated switches 71 and 72, or 73 in parallel with contacts 68'''. Contacts 69''' energize the solenoid of the brake-clutch air valve, releasing the brake and closing the clutch, allowing the machine to cycle or "inch." Relay 69 contacts 69' open, removing the energizing circuit from relay 68 until relay 69 is deenergized. If the selector switch is in the "inch" position contacts 68' hold relay 68 in until the selector switch is changed or power is removed from line 61 and relay 69 will only be energized while the palm button operated

switches 29 and 30 are depressed. If the selector switch 36 is in the single position, the switch 74 holds relay 68 in. Upon depressing either the foot switch 38 or the palm button operated switches 29 and 30 relay 69 is energized and locks in through switches 71, 36 and 72, when the flywheel 16 has turned through approximately 90°, switch 74 opens and relay 68 is deenergized and, when the flywheel is turned through 360°, switches 71 and 72 are opened, relay 69 is deenergized. If the selector switch 36 is in the continuous position, relay 68 locks in through the top stop switch 32 and upon depressing the palm button operated switches 29 and 30, relay 69 is energized and locks in through either contracts 68''' or switch 73. Hence, by opening switch 32 by depression of the top stop button 32', relay 68 is deenergized leaving only switch 73 to hold relay 69 energized. Switch 73 is opened when the flywheel 16 is in a position so that the press stops with the ram 12 in its uppermost position.

It should be clear from the foregoing description that the main disconnect switch 47, when thrown open by swinging the control panel outwardly from its normal closed position, cuts off all power to the press, making it completely safe for the setup man or operator to do whatever has to be done on the machine before resuming operation, although the die lights 35 can be used by closing switch 34 and, of course, power is still supplied to the sockets 41 to enable use of power for one or more extension cords or electrically operated tools. It is only when the control panel 21 is returned to its normal closed position that the press is again restored to its normal operating condition.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. While a preferred embodiment of the invention has been illustrated and described, this is only for the purpose of illustration, and it is to be understood that various modifications in structure will occur to a person skilled in this art.

I claim:

1. In a power-operated machine of the character described, comprising a frame, a source of electric current supply, an electric drive motor, a clutch that is electrically controlled for transmitting drive from the motor to a part on the machine to be driven, a control panel mounted on the frame carrying control buttons operable manually to operate switches on the panel connected in circuit with current source and said drive motor and clutch, said panel being hinged to be swingable relative to said frame except when secured detachably by manually operable fastening means in a fixed operative position relative to said frame, and a disconnect switch connected in circuit with said other switches and operable automatically from a closed position to an open position when the control panel is swung from its fixed operative position.

2. A machine as set forth in claim 1 wherein the control panel when swung from its fixed operative position serves as a light reflector, the machine including lighting means on the inner side of the panel controlled by manually operable switch means independently of the other switches on the control panel and the disconnect switch.

3. A machine as set forth in claim 1 including a brake and an electrical solenoid operable air valve connected with air operable means for operating said clutch and brake, said means being controlled by one of the switches operated by the manually operable buttons on the control panel, whereby the brake is set upon disconnection of the disconnect switch when the control panel is swung away from its operative position.

4. A machine as set forth in claim 1 wherein the hinged control panel includes a hinged front cover plate adapted to be swung outwardly relative to said panel to afford access to the switches and wiring carried on said panel.

5. A machine as set forth in claim 1 wherein said disconnect switch is carried on said control panel and has a spring-pressed button adapted normally to move outwardly relative to said switch to open position when said panel is swung outwardly relative to said frame, and a projection on said frame registering with and depressing said button to closed position in the fixed operative position of said panel.

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6. A machine as set forth in claim 1 wherein there is a control box on said frame containing a main power switch and other electrical controls and said control panel has an elongated flexible electrical conduit extending therefrom containing wires extending from the switches on said panel, said conduit extending through the hinge mounting of said panel to said control box for connection of the wires with said main power switch and other controls in concealed insulated relationship to said panel and frame throughout its length.

7. A machine as set forth in claim 1 wherein said control panel is of elongated form and extends substantially horizontally across the front of the machine frame and is hinged at one end on a substantially vertical axis and has the fastening means at its other end for securing the same in fixed operative position with the disconnect switch in closed position.

8. A machine as set forth in claim 1 wherein said control panel is of elongated form and extends substantially horizontally across the front of the machine frame and is hinged at one end on a substantially vertical axis and has the fastening means at its other end for securing the same in fixed operative position with the disconnect switch in closed position, the disconnect switch including a spring-pressed button exposed on the rear of said panel intermediate its ends moving rearwardly to open position when the panel is swung forwardly away from the frame, said switch being closed automatically by depression of said button when said panel is returned to its normal fixed position relative to said frame.

9. A machine as set forth in claim 1 wherein said control panel is of elongated form and extends substantially horizontally across the front of the machine frame and is hinged at

one end on a substantially vertical axis and has the fastening means at its other end for securing the same in fixed operative position with the disconnect switch in closed position, the disconnect switch including a spring-pressed button exposed on the rear of said panel intermediate its ends moving rearwardly to open position when the panel is swung forwardly away from the frame, said switch being closed automatically by depression of said button when said panel is returned to its normal fixed position relative to said frame, a substantially horizontal projection on said frame registering with and depressing said button in the normal fixed position of said control panel.

10. A machine as set forth in claim 1 wherein said control panel is of elongated form and extends substantially horizontally across the front of the machine frame and is hinged at one end on a substantially vertical axis and has the fastening means at its other end for securing the same in fixed operative position with the disconnect switch in closed position, the disconnect switch including a spring-pressed button exposed on the rear of said panel intermediate its ends moving rearwardly to open position when the panel is swung forwardly away from the frame, said switch being closed automatically by depression of said button when said panel is returned to its normal fixed position relative to said frame, said panel serving as a light reflector when swung forwardly away from said frame, the machine including electric light means on the back of said panel, and switch means controlling said light means independently of the disconnect switch and other switches.

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