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SWITCH ACTUATING MECHANISM FOR ELECTRICAL POWER TOOL DEVICES

3,312,799

Filed May 14, 1965

2 Sheets-Sheet 1

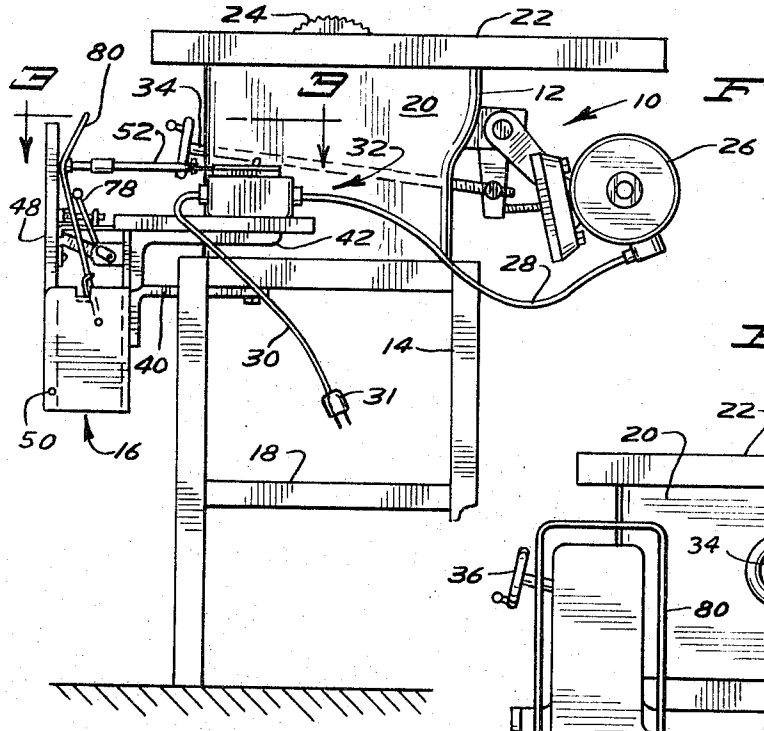
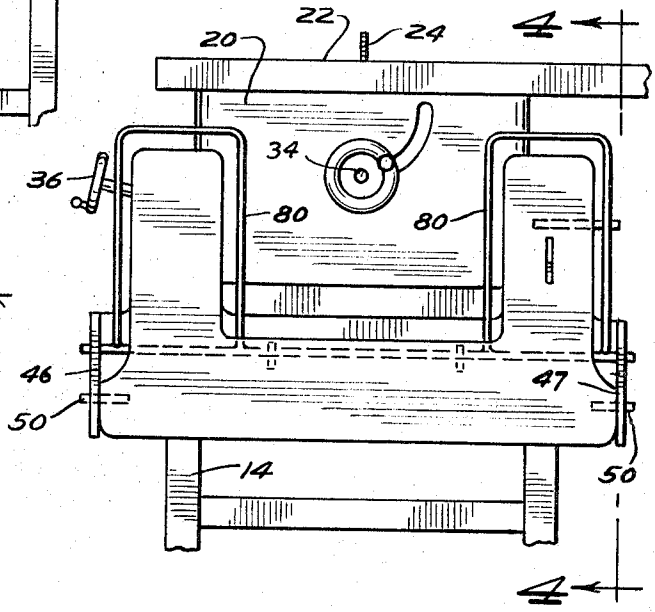


FIG. 1

FIG. 2



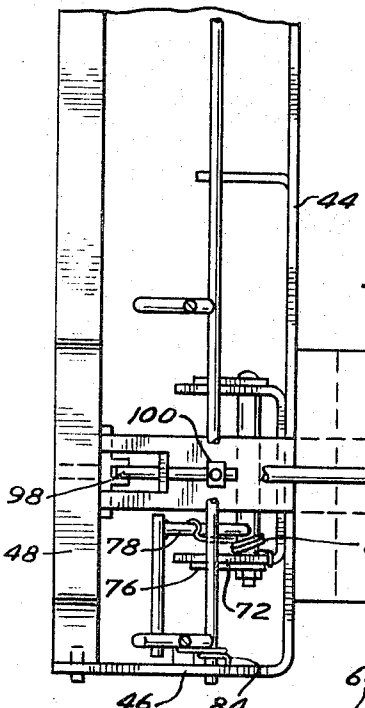
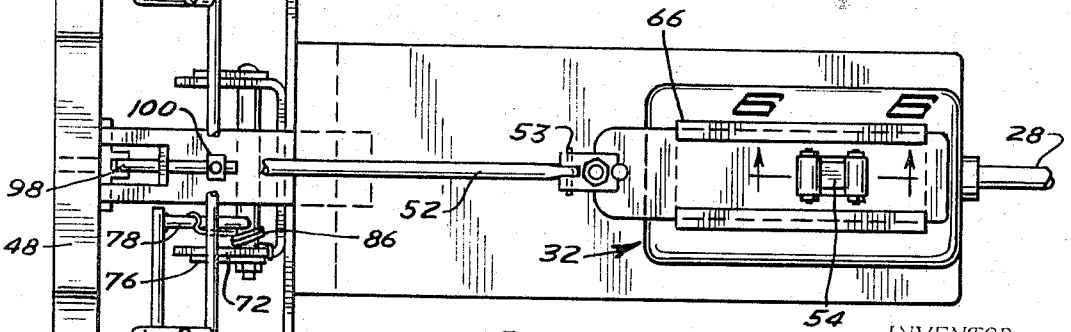


FIG. 3



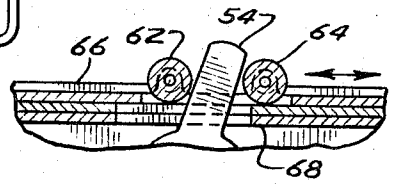


FIG. 6

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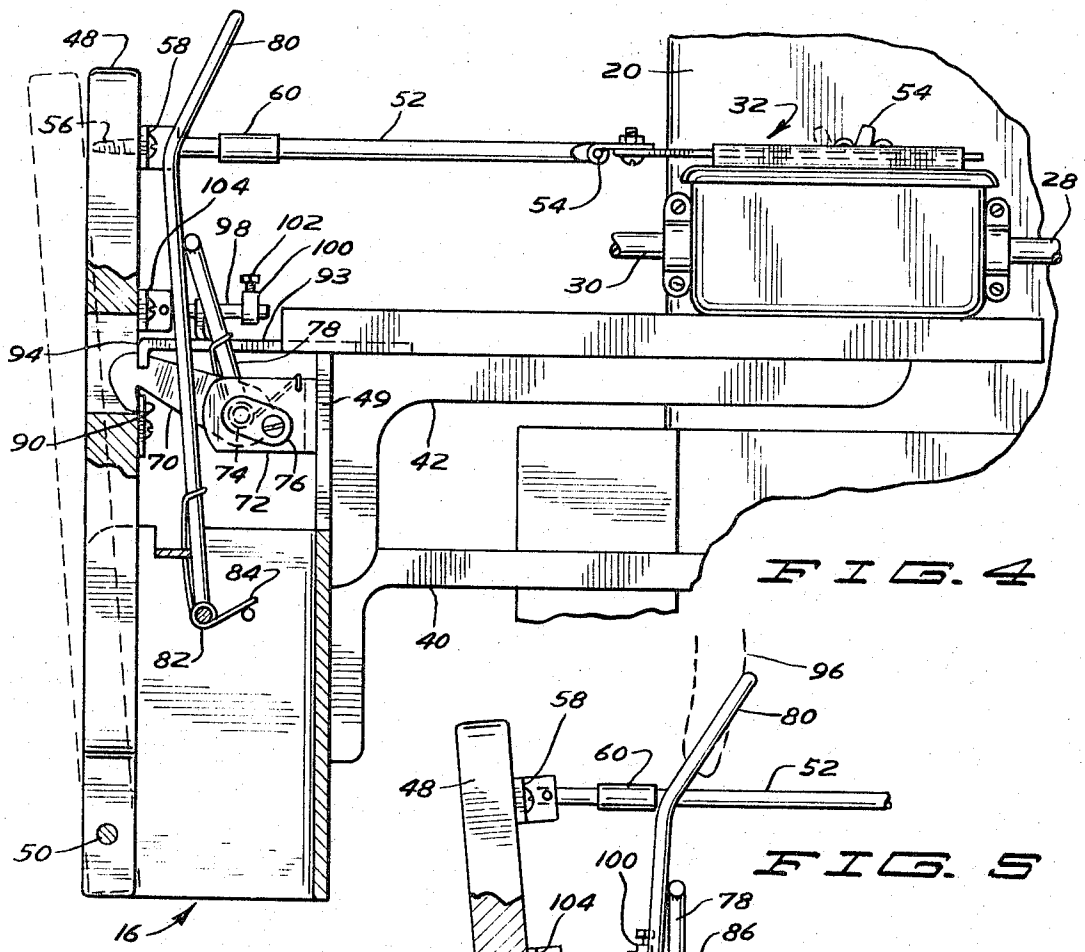

FIG. 4

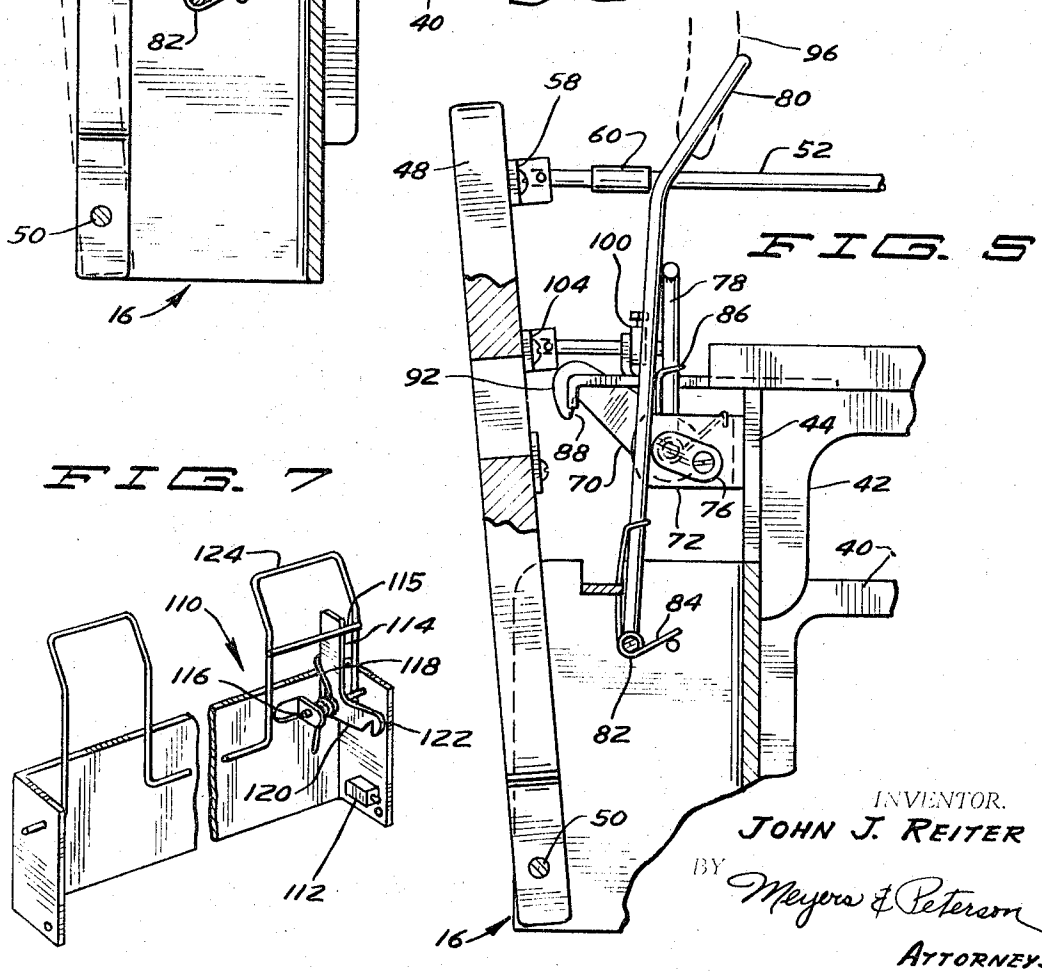

FIG. 5

FIG. 7

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SWITCH ACTUATING MECHANISM FOR ELECTRICAL POWER TOOL DEVICES

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3 Claims. (Cl. 200—61.58)

The present invention relates generally to a switching appartus which is useful in the control of power driven tools, and more particularly to such an apparatus which is directed to the safe operation of such tools, the apparatus permitting a switch to be opened to terminate the flow of power to the tool upon simple physical engagement of a control panel. The apparatus further includes means for initiating the flow of power to a power driven tool by means of a reasonably simple motion which requires only normal adult agility for its operation.

In a normal running situation, the operator of a power tool normally stands in an operator's station with both hands being occupied by the specific operation. Both hands may be used in guiding the work, or one may be used in guiding the work while the other is used in controlling the movement of the tool. Certain of these tools are provided with toggle switches or the like for controlling the flow of electrical power to the unit, these switches normally being disposed adjacent to the operator's station. Frequently, and as an alternate, certain of these tools may be provided with a foot pedal or foot switch which must be depressed or otherwise acted upon in order to control the flow of power to the tool. In each of these instances, an unusual movement is normally required which includes the operator taking his eyes from the work to locate the switch, or some other unusual movement is required which will permit the operator to properly actuate the switch mechanism.

In accordance with the present invention, a substantially "U" shaped panel is provided which has a configuration including a pair of substantially upstanding legs disposed on opposite sides of a base member, the member being pivotally mounted along the base to the frame structure of the power driven tool apparatus. The panel has means coupled thereto which permits opening and closing of a switch, as desired, for either turning off or turning on power to the power driven tool. The switch depends solely upon the disposition of the panel relative to the support frame for its control of the switch. Each of the upstanding legs is adapted to be engaged by the operator's leg, the operator being able to engage either of these legs almost as a reflex reaction and without a substantial change of position. Therefore, it is possible for the operator to discontinue the flow of power to the tool by merely striking one of the upstanding legs of the panel, the legs being disposed immediately adjacent the operator's station in order to eliminate any delay in striking the panel because of the operator having to search for its location. In addition, since a relatively large surface area is being utilized to actuate and control the disposition of the switch controlling the flow of power to the power tool, a latch means is provided which releasably retains the panel in the closed position. Therefore, inadvertent actuation of the panel is not likely to occur since the latch means must be specifically disengaged substantially simultaneously with the movement of the panel which closes the switch contacts to permit current flow to the power unit.

Therefore, it is an object of the present invention to provide an improved safety device for the control of power driven tools, the safety device including a panel which is pivotally mounted upon the support frame of the power tool, and which, upon being engaged by the operator's leg, will terminate the flow of power to the unit, the panel being further provided with a catch means or latch means which releasably retains the panel in a normal-off position.

It is still a further object of the present invention to provide an improved safety device for the control of power driven tools which permits the flow of energy to the tool to be interrupted by application of pressure to a panel disposed adjacent an operator's station, the panel being conveniently located to permit the interruption of power as a reflex action without requiring a search for the panel location.

It is still a further object of the present invention to provide an improved safety device for the control of power to power driven tools which includes a panel having a base together with two parallelly disposed spaced upstanding legs, the panel being pivotally mounted in its own frame, which can be attached to the power tool frame, the panel being provided with latch means which permit unilateral free movement only in the direction to open the power supply circuit, and which restrict the movement in the direction to close the power supply circuit.

Other and further objects of the present invention will become apparent to those skilled in the art upon a study of the following specification, appended claims, and accompanying drawing wherein:

FIGURE 1 is a side elevational view of a power driven saw tool mounted on a support frame, and having the safety control device of the present invention attached to the front panel thereof, a portion of the support frame being shown broken away;

FIGURE 2 is a front elevational view of the power driven saw tool and safety control device of the present invention as shown in FIGURE 1, a portion of the support frame being shown broken away in this figure;

FIGURE 3 is a horizontal sectional view taken along the line and in the direction of the arrows 3—3 of FIGURE 1;

FIGURE 4 is a vertical sectional view taken along the line and in the direction of the arrows 4—4 of FIGURE 2;

FIGURE 5 is a detail sectional view similar to FIGURE 4, and showing the motion or movement necessary to open the panel retaining latch;

FIGURE 6 is a detail vertical sectional view of a toggle switch coupled to an actuating mechanism in accordance with one aspect of the present invention; and

FIGURE 7 is a front perspective view of a portion of a modified safety control device prepared in accordance with the present invention.

Attention is now directed to the drawings, particularly FIGURES 1–6 inclusive, wherein the preferred embodiment of the safety control device of the present invention is shown attached to a power driven saw unit. It will be appreciated that the safety control device of the present invention is equally applicable to use in combination with any of a variety of power driven tools such as, for example, saws, jointers, planers, drill-presses, or the like. In this connection, the assembly generally designated **10** includes a power saw **12** together with a supporting frame structure **14**. The safety control device of the present invention is shown attached or mounted to the face of the saw **12**, the safety control device being generally designated **16**. The support frame **14** includes the conventional vertical legs along with the conventional cross braces such as are illustrated at **18**, the frame **14** being adequately designed to support the saw **12** thereon. The saw **12** includes a panel enclosure or housing **20** together with a work supporting surface **22**. The circular saw blade **24** is driven by the electric motor **26**, current being supplied to the motor **26** from the power line including a segment **28** and a segment **30**, these segments being interrupted by a switch member which is shown generally

at 32. As is conventional in table saws of this type, an arbor elevating arm 34 is provided to control the elevation of the saw 24 relative to the work supporting surface 22, and an arbor tilting member is shown at 36 in order to control the disposition of the axis of the circular saw 24 relative to the work supporting surface 22. These features are, of course, generally found in all power driven tools of this type, and as such do not form any part of the present invention.

With specific attention being directed to the safety control device generally designated 16, it will be seen that this device is provided with anchor frame member 40 and support member 42 which is integral with rear of safety switch frame; anchor frame 40 being designed to bolt to the support frame 14 of the saw assembly 12 for the purpose of mounting the safety control device in a position which is immediately in front of the operator's station. When in this station, the operator faces the circular saw assembly 10 as shown in FIGURE 2. The safety control device comprises a base frame member or panel 44 which is in turn secured to the mounting members 40 and 42, the panel 44 having a pair of forwardly turned flanges 46 and 47 which are adapted to retain portions of the components of the safety control device. The substantially "U" shaped panel member is shown at 48, this panel member having a base and a pair of parallelly disposed spaced legs secured thereto, the entire panel member being adapted to pivot about the pivot axis 50 between a retracted position such as is shown in solid lines in FIGURE 4, and an extended position such as is shown in phantom in FIGURE 4 and also in FIGURE 5. The switch means 32 are operatively associated with the panel member by means of the connecting rod 52, the switch means having a protruding control member or the like as at 54 for coupling the motion of the panel 48 to the switch contacts per se. As indicated, the switch means 32 is a bistable switch means which has one stable position as shown in full lines in FIGURE 4, this being the off position; and a second position shown in phantom in FIGURE 4, this being the on position. The switch is preferably a double pole-single throw toggle type actuated by reciprocatory to-and-fro motion, such as may be imparted thereto by the pivotal rocking of the panel 48 about the axis 50. In order to accommodate any arcuate pivotal motion of the arm 52 between the stationary position of the switch enclosure 32, and the pivotal motion of the panel 48, a pivot pin is disposed at 53. The arm 52 is secured to the rear face of the panel 48 by any convenient means, such as by the screws 56 which pass through the plate 48 and the flanged clamping member 58. If desired, an adjusting collar or union may be interposed in the rod 52 such as at 60 in order to match the position of the panel 48 with the disposition of the switch actuating arm 54.

In order to control the operation or actuation of the arm 54 smoothly, the rod 52 has a pair of roller members 62 and 64 which are disposed on opposite sides of the arm 54, in closely spaced relationship therewith. These rollers, are as indicated, coupled, secured or mounted on the top sliding plate 66 which is adapted to slide relative to the base plate assembly 68 in to-and-fro motion, as illustrated in FIGURE 6. This motion will in turn render the contacts of the switch in opened or closed disposition.

Particular attention is now directed to the latching or locking mechanism generally designated 16 which is shown in operative relationship with the panel member 48. The latching mechanism includes a hook member 70 which is pivotally secured to the mounting bracket 72, the bracket 72 being secured to the panel 44. A pivot axis or pin is provided at 74, and locking ears 76 are disposed against the surface of the mounting bracket 72 in order to hold the latch 70 in place. Integral with the pivot axis 74 for the latch 70 is the resiliently biased release arm or lever 78 which is adapted to ride against

the main release arm 80. Main release arm 80 is also resiliently biased in a position normally urged toward the panel 48 about the pivot 82, the resilient bias being provided by the resilient clip member 84. A resilient clip member 86 provides constant tension or bias for urging the release arm or lever 78 against the releasing lever 80. The latch 70 includes a locking surface as at 88, this locking surface 88 being adapted to engage the stop member 90 which is mounted integrally with the panel 48. The other surface of the latch 70 is cammed as at 92 in order to permit unilateral motion of the panel 48 toward the latch 70 in order to permit the surface 88 to become locked against the inner surface of the plate 90.

Therefore, in order to disengage the latch 70 from the panel 48, the operator inserts his hand or fingers as shown at 96 in FIGURE 5 and pivots the lever 80 in a clockwise direction. This pivotal movement will cause a pivotal rocking of the release arm 78 in a clockwise direction which will lift the latch 70 from engagement with the plate 90. The panel 48 may then be pivoted in a counterclockwise direction, this moving the switch means 32 from an opened to a closed position. This operation is shown clearly in FIGURES 4 and 5. The mounting member 42 includes a bifurcated extension as at 93 having a downwardly turned outer extremity as at 94. This downwardly turned portion or surface may be conveniently utilized as a stop means for securely locking the panel 48 in its locked position as shown in solid lines in FIGURE 4. If the operator should desire to leave the machine unattended in an area where children may be present, it is possible to lock the rod 98 in captive relationship with the guide 100, by means of tightening the set screw 102. The rod 98 is secured to the panel 48 by means of the flanged clip 104 and the screws shown in operative relationship with the panel 48.

In FIGURE 7, a modified safety control device is shown. In the apparatus of FIGURE 7, the apparatus generally designated 110 includes a panel member 48 as previously shown, this panel being pivotal about the pivot axis 50. In lieu of the arm member 52 which couples the pivotal motion of the panel 48 to the switch means 32, a small micro-switch or the like with an actuating rod protruding therefrom is provided at 112, the pivotal motion of the plate 48 being controlled by the bellcrank latch 114. The latch 114 is pivoted for rotation about the shouldered bolt 116, and is normally resiliently biased in a closed or latched position by means of the resilient spring member 118. This arrangement makes it possible to open the latch 122 by means of a pivotal movement of the main trigger arm 124 acting against the upright arm of bellcrank 114 which rides freely against a horizontal bar 115 in the trigger arm 124. Therefore, pivotal rotation in a clockwise direction of the trigger bar assembly 124 will open the latch 122 and permit the panel to be pivoted counterclockwise away from the saw 10.

It will, of course, be understood that various changes may be made in the form, details, arrangements, and proportions of the parts without departing from the scope of the invention as set forth in the appended claims.

What is claimed is:

1. In combination with a power driven tool having a work supporting surface mounted upon a support frame and a normal operator's station adjacent thereto, switch means controllably actuated by a reciprocatory to-and-fro motion for controlling the flow of energy to said power driven tool; control plate means operatively secured to said support frame and disposed adjacent said operator's station for controlling said switch means, said control plate comprising a generally upstanding substantially "U" shaped panel member pivotally secured to said support along a pivot axis adjacent the base of said panel member with each leg of said "U" shaped panel member being adapted for reciprocatory arcuate to-and-fro movement about said pivot axis toward and away from said support frame between an extended and a retracted position and being disposed for abutting contact with

the legs of an operator in said station and adjacent said tool, and means coupling the reciprocatory pivotal motion of said panel member to said switch means for permitting energy flow to said tool when said panel is in said extended position and for interrupting said flow of energy when said panel is in said retracted position, said latch means being secured to said support frame and being provided for retaining said panel in locked disposition in said retracted position, and including a pair of latch control means releasably retaining the latch means in a normal locked disposition, with one latch control means being disposed adjacent each leg of the "U" shaped panel member.

2. In combination with a power driven tool having a work supporting surface mounted upon a support frame and a normal operator's station adjacent thereto, switch means controllably actuated by a reciprocatory to-and-fro motion for controlling the flow of energy to said power driven tool; control plate means operatively secured to said support frame and disposed adjacent said operator's station for controlling said switch means, said control plate comprising a generally upstanding substantially "U" shaped panel member pivotally secured to said support along a generally horizontally disposed pivot axis adjacent the base of said panel member being adapted for reciprocatory arcuate to-and-fro movement about said pivot axis toward and away from said support frame between an extended and a retracted position and being disposed for abutting contact with the legs of an operator in said station and adjacent said tool, and means coupling the reciprocatory pivotal motion of said panel member to said switch means for permitting energy flow to said tool when said panel is in said extended position and for interrupting said flow of energy when said panel is in said retracted position, and latch means, secured to said support frame, for retaining said panel in locked disposition in said retracted position, said latch means including latch control means disposed immediately adjacent said "U" shaped panel member.

3. In combination with a power driven tool having a work supporting surface mounted upon a support frame with a normal operator's station disposed adjacent thereto, bistable switch means controllably actuated by a reciprocatory to-and-fro motion for controlling the flow of energy to said power driven tool; control plate means operatively secured to said support and disposed adjacent said operator's station for controlling said bistable switch means, said control plate comprising a panel member pivotally secured to said support along a first generally horizontally disposed pivot axis adjacent the base of said panel member with the panel member being adapted for reciprocatory arcuate to-and-fro movement about said pivot axis toward and away from said support between an extended and a retracted position and being disposed for abutting contact with the legs of an operator in said station, means coupling the reciprocatory pivotal motion of said panel member to said bistable switch means for permitting energy flow to said tool when said panel is in said extended position, and for interrupting said flow of energy when said panel is in said retracted position, and latch means releasably retaining said panel in locked relationship in said retracted position, said latch means including a pair of latch control means, said latch means being adapted to unilaterally permit free movement of said panel only from said extended position to said retracted position, said latch control means releasably retaining the latch means in a normal locked disposition with one latch control means being disposed adjacent each leg of the "U" shaped panel member.

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