United States Patent

[11] 3,598,162

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[54] **SWITCH INTERLOCK**
7 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** ..... **143/6 A, 200/44**
[51] **Int. Cl.** **B27b 5/20**
[50] **Field of Search** 143/6, 47; 200/44, 61.68

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ABSTRACT: The device disclosed herein is a radial arm saw which includes a base frame having an upstanding column pivoted thereon about a generally vertical axis. A radial arm is rigid with the column and has a saw carriage supported thereon for movement longitudinally thereof. An electric motor driven saw is suspended from the carriage and is adapted to cut workpieces situated on a table supported upon the base frame. The motor is controlled by a switch on the arm, and means is provided to prevent inadvertent or accidental actuation of the switch.

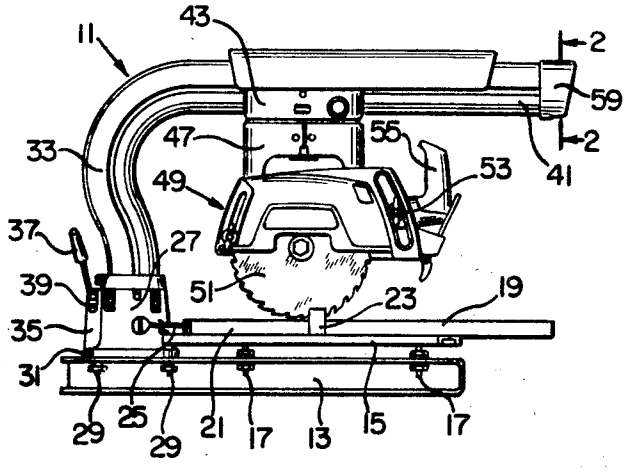


FIG. 2

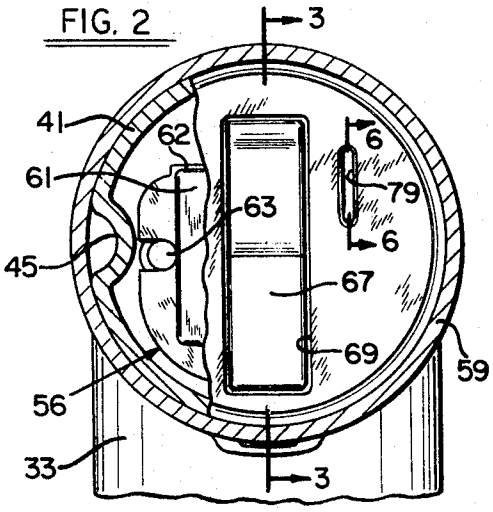


FIG. 1

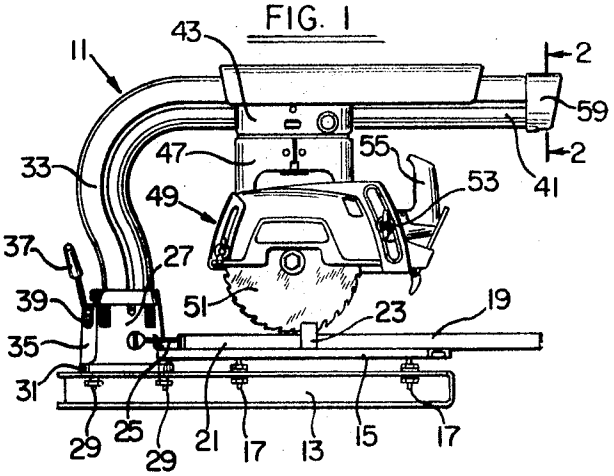


FIG. 3

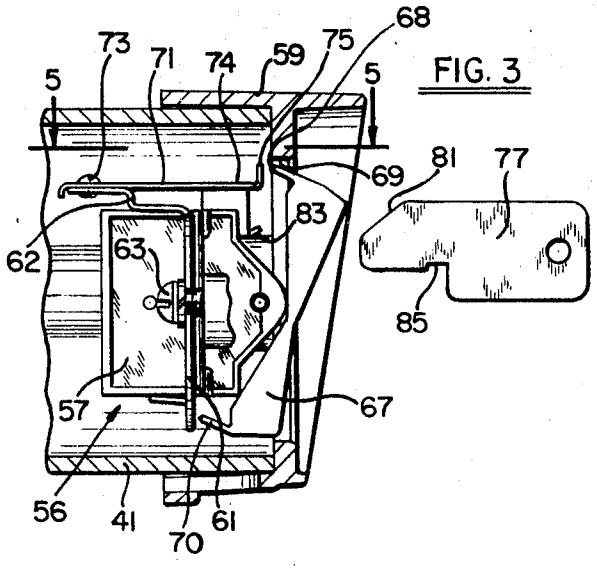


FIG. 4

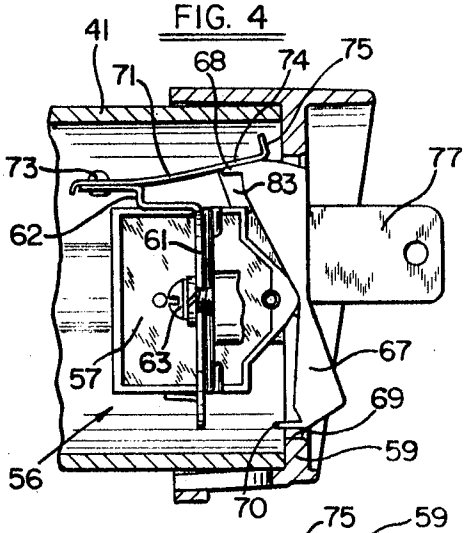


FIG. 5

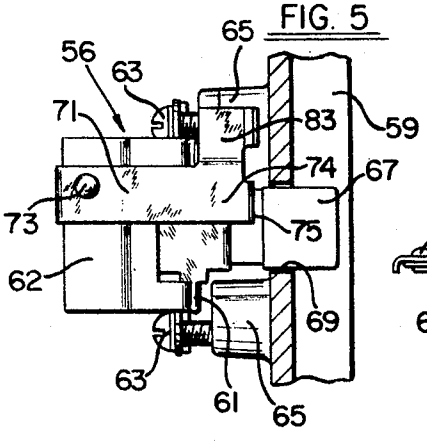


FIG. 6

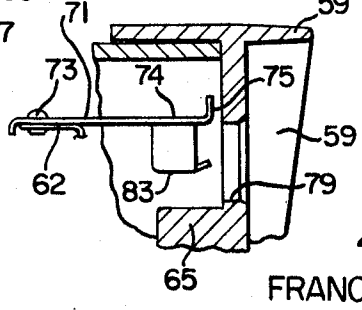
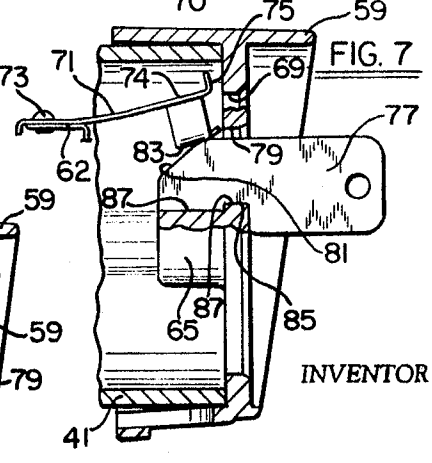


FIG. 7



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SWITCH INTERLOCK

SUMMARY OF THE INVENTION

The present invention is directed to a switch locking means or interlock which finds particular use in a power tool, for example, a radial arm saw. The interlock includes a spring strip normally positioned to prevent movement of a switch lever to its "on" position. A separate keylike member is provided which, when properly inserted into the switch assembly, moves the spring strip and allows the switch lever to be turned "on." They key and switch assembly are constructed such that the key is retained in the inserted position in detent fashion by the spring strip but is easily removed therefrom when desired.

Main objects of the present invention, therefore, are to provide an improved switch interlock construction which requires a positive act to ready the switch to be turned "on," and which is simple and inexpensive while being safe and virtually foolproof in performance.

Further important objects of the invention are to provide an improved construction of the above character wherein the parts are retained together when assembled for switch actuation, but are easily separated when switch locking is desired.

Other objects and advantages of the invention will become more apparent from a consideration of the detailed description to follow taken in conjunction with the drawings annexed hereto.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view illustrating a radial arm saw embodying the present invention;

FIG. 2 is an enlarged sectional view, partially broken away, taken along the line 2–2 of FIG. 1;

FIG. 3 is a sectional view of FIG. 2 taken along the line 3–3 thereof and showing the parts in position for switch locking and with the switch "off";

FIG. 4 is a view similar to FIG. 3 but showing the switch released and in the "on" position;

FIG. 5 is a sectional view of FIG. 3 taken along the line 5–5 thereof;

FIG. 6 is a sectional view of FIG. 2 taken along the lines 6–6 thereof; and

FIG. 7 is a view similar to FIG. 4 but with parts removed and in section for clarity.

BROAD STATEMENT OF THE INVENTION

Broadly described, the present invention relates to a radial arm saw comprising a base frame having an upstanding column pivoted thereon about a generally vertical axis, an arm rigid with said column and extending over a generally horizontal worktable on said base frame, a carriage supported for movement along said arm, an electric motor powered saw unit suspended from said carriage for movement therewith, switch means for turning said saw unit "on" and "off," said switch means including a housing on the end of said arm remote from said column, a switch body mounted within said housing, a switch lever pivoted on said switch body and accessible from outside said housing, said switch lever being movable from an "off" position to an "on" position, resiliently biased means including a resilient member within said housing and normally in a relatively unstressed condition positioned in the path of said lever to prevent movement of said lever from said "off" to said "on" position, and releasing means manually insertable into said housing from outside thereof to engage and move said resilient member out of its normal position whereby to allow free pivotal movement of said lever.

DETAILED DESCRIPTION

Referring now specifically to the drawings, a radial arm saw embodying the present invention is illustrated generally at 11 in FIG. 1 and is seen to include a pair of base frames 13 (only one of which is shown) each having a cleat 15 secured thereto

by fasteners 17. A worktable has a stationary portion 19 secured in suitable fashion to the cleats 15 and a removable portion 21 held against a work fence 23 by a plurality of clamps 25 (only one of which is shown).

The base frames 13 have an upstanding hollow hub 27 secured thereto by fasteners 29 which extend through the frames 13 and a baseplate 31 formed integrally with the hub 27. The hub 27 is generally cylindrical in cross section and is split along a major portion of its length. An upstanding column 33 has its lower end received in and supported by the hub 27 and is adapted to be secured in place by drawing up on a pair of opposed radial flanges 35 (only one of which is shown). To this end, a locking lever 37 extends through the flanges 35 and bears against one of these flanges while being threaded into a nut 39 trapped on the other flange 35. Thus, by turning the lever 37 in one direction, the flanges 35 are drawn together and the hub 27 tightly grips the column 33 and locks it in place. Conversely, when the lever 37 is turned in the other direction, the hub 27 is loosened on the column 33 and allows it to be turned.

The column 33 has a radial arm 41 rigid therewith and extending over the worktable. A carriage 43 is supported for movement along the arm 41 by ball means (not shown) which ride in diametrically opposed groovelike tracks 45 formed in the arm 41. A yoke 47 is suspended from the carriage 43 and has an electric motor driven saw unit 49 fixed thereto. The saw unit 49 includes a driven circular saw blade 51 adapted to cut workpieces situated on the worktable. The depth of this cut is adjustable by adjusting the elevation of the saw unit 49 relative to the yoke 47. The saw unit 49 is secured in position on the yoke 47 by means of a wing nut 53. A handle 55, rigid with the yoke 47, facilitates easy manipulation of the carriage 43 and saw unit 49 along the arm 41.

An on-off electric switch 56 is secured in place in a switch housing 59 at the end of the radial arm 41 remote from the column 33. This switch 56, which controls the saw unit 49, includes a switch body 57 secured to the housing 59 by a mounting plate 61 and a pair of screws 63 threaded into bosses 65 on the housing 59. A switch rocker or lever 67 is pivoted on the body 57 and is located in an opening 69 in the housing 59 for free access by the operator. The lever 67 is pivotal from an "off" position, shown in FIGS. 3 and 5, to an "on" position, shown in FIG. 4, to correspondingly turn the saw unit 49 "off" and "on." The switch lever 67 also has projecting fingers 68, 70 at opposite ends thereof to prevent access to the interior of the switch housing 59 through the opening 69.

In order to prevent the saw unit 49 from being turned "on" inadvertently or accidentally, a novel switch interlock or switch locking means is provided. This interlock is constructed such that it requires a positive act by the operator to release the interlock so that the switch can be turned "on." In addition, this construction has the advantage of retaining itself in place during the time the saw unit is "on" but is easily disengaged to bring the interlock back into play when desired.

Thus, as shown in FIGS. 3 and 5, the mounting plate 61 has a rearward extension 62 with a spring steel strip 71 secured at one end thereto in cantilever fashion by a rivet 73. The unsupported end of the strip 71 is illustrated at 74 and has a bent-up tab 75 which presents an abutment surface for one end of the switch lever 67 to selectively prevent pivotal movement of the switch lever 67 in one direction as will be described.

In the position of the parts shown in FIGS. 3 and 5, the switch 56 is "off" and the spring strip 71 is unstressed. In order to turn the switch 56 "on," it is necessary to pivot the lever 67 counterclockwise, as shown in FIG. 3, and this is prevented by interfering engagement between the finger 68 on the lever 67 and the bent-up tab 75 on the spring strip 71. Thus, in this position of the parts, the switch 56 cannot be inadvertently or accidentally turned "on."

When it is desired to turn the switch 56 "on," the operator inserts a keylike member 77 into an aperture 79 in the front of the switch housing 59. The key 77 has an inclined cam surface 81 engageable with a dependent leg portion 83 formed on the

free end 74 of the spring strip 71 so that when the key 77 is fully inserted, as shown in FIGS. 4 and 7, the bent-up tab 75 is lifted out of the path of the finger 68 on the lever 67. Thus, in this position of the parts, the switch lever 67 can be pivoted to the "on" position.

When it is again desired to lock the switch lever 67, or reengage the switch interlock, the key 77 is removed from the aperture 79. If the switch lever 67 is in the "off" position, shown in FIG. 3, the free end 74 of the spring strip 71 returns to its normal position at this time and the switch lever 67 cannot thereafter be turned "on." If, on the other hand, the switch lever 67 is "on" when the key 77 is removed, the spring strip free end 74 moves into engagement with the outer edge of the switch lever 67 at the finger 68. Thereafter, when the switch lever 67 is turned to the "off" position, the spring strip free end 74 returns to its normal position, shown in FIG. 3, and thereafter prevents the switch lever 67 from being turned "on."

It will be appreciated that vibratory forces arise during use of the device and might tend to dislodge the key 77 from the apertures 79. To prevent this, the key 77 has a notch 85 which receives a shoulder like projection 87 on the switch housing 59 when the key 77 is inserted in the aperture 79. The free end 74 of the spring strip 71 bears downwardly on the key 77 at the cam surface 81 and holds the projection 87 and notch 85 engaged in detentlike fashion so that the key 77 will not accidentally come loose. However, when it is desired to remove the key 77 from the aperture 79, the operator raises up on the key 77 thereby lifting the notch 85 clear of the projection 87. The key 77 is then freely withdrawn from the aperture 79.

By the foregoing, there has been disclosed an improved switch interlock construction calculated to fulfill the inventive objects set forth, and while a preferred embodiment has been illustrated and described in detail, various additions, substitutions, modifications and omissions may be made thereto without departing from the spirit of the invention.

I claim:

1. A radial arm saw comprising a base frame having an upstanding column pivoted thereon about a generally vertical axis, an arm rigid with said column and extending over a generally horizontal work table on said base frame, a carriage supported for movement along said arm, an electric motor powered saw unit suspended from said carriage for movement

therewith, switch means for turning said saw unit "on" and "off," said switch means including a housing on the end of said arm remote from said column, a switch body mounted within said housing, a switch lever pivoted on said switch body and accessible from outside said housing, said switch lever being movable from an "off" position to an "on" position, resiliently biased locking means including a resilient member within said housing and normally in a relatively unstressed condition being positioned in the path of said lever to prevent movement of said lever from said "off" to said "on" position, and releasing means manually insertable into said housing from outside thereof to engage and move said resilient member out of its normal position whereby to allow free pivotal movement of said lever.

2. A construction as defined in claim 1 wherein said resilient member comprises a spring strip normally positioned in the path of pivotal movement of said lever, said releasing means being engageable with said resilient member to flex it in a direction out of said path.

3. A construction as defined in claim 1 which includes cooperable detent means on said releasing means and said housing engageable when said releasing means is in said housing.

4. A construction as defined in claim 1 wherein said locking means comprises a spring strip secured to said switch body in cantilever fashion, said strip having its free end bent substantially transversely of its length, said bent end being normally in the path of said lever.

5. A construction as defined in claim 1 wherein said releasing means comprises a key having a cam surface thereon engageable with said resilient member, cooperable detent means on said key and said housing to prevent accidental withdrawal of said key.

6. A construction as defined in claim 4 wherein said spring strip has a lateral leg portion formed adjacent its free end, said housing having an aperture laterally of said lever for insertion of said releasing means.

7. A construction as defined in claim 5 wherein said detent means includes a notch and a projection on said key and housing, respectively, said locking means including a member normally biased toward engagement with said key, whereby to retain said notch and projection in engagement and said key in said housing.