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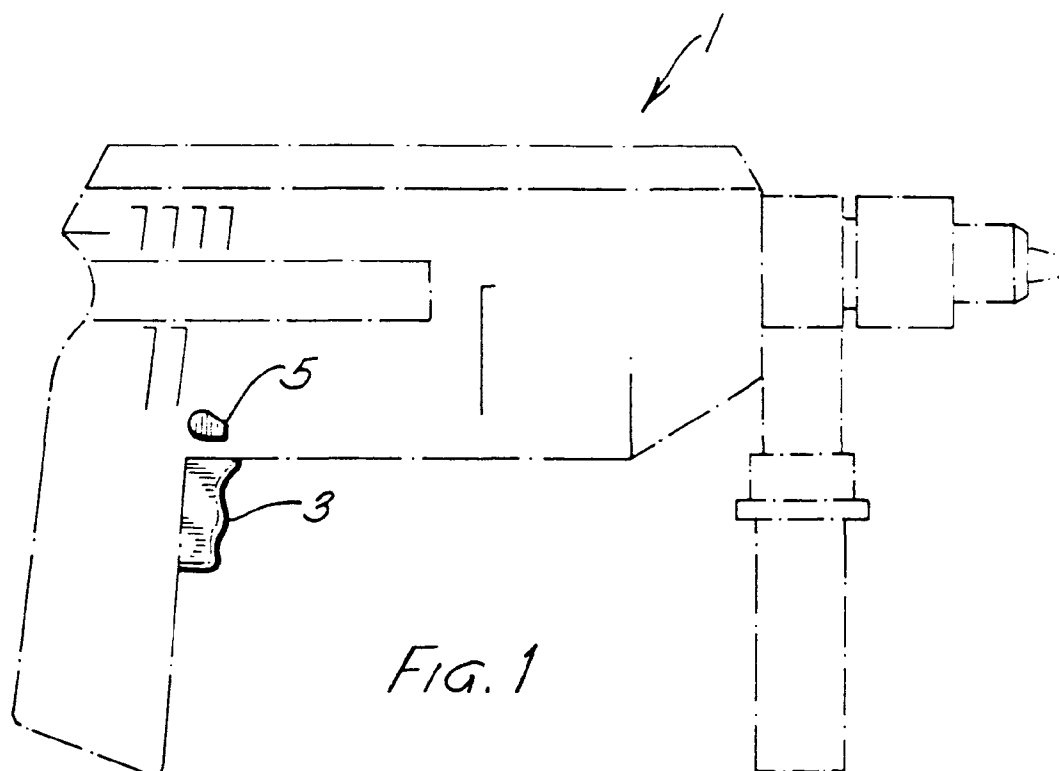
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(54) **A lock-on, lock-off switch**

(57) A lock-on, lock-off switch for a power tool 1, comprising a trigger 3 movable in a first plane for completing and breaking a circuit to actuate and deactivate the tool 1, and a locking device 5 movable in a second plane substantially perpendicular to the first plane be-

tween a first position in which the trigger 3 is prevented from completing the circuit and a second position in which the trigger 3 is held completing the circuit. By providing a switch which may be locked both on and off, a safer switch arrangement is provided.



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Description

This invention relates to switches, and in particular to a lock-on, lock-off switch for a power tool or the like.

It is known to energise a power tool, such as a drill, by means of a trigger which can be gripped by one or two fingers of a user's hand. By squeezing the trigger, a circuit within the body of the drill is completed, thereby resulting in power reaching the motor to drive the drill.

Some known power drills include a button on one side of the drill body which, if depressed whilst the drill motor is energised, engage in an aperture in the trigger to hold the trigger in its "on" position. The button is biased into its inactive position and, when the trigger is once again squeezed, the button disengages from the trigger to allow the trigger to be released completely such that the power drill is turned off.

The applicant is unaware of a power tool, which incorporates a locking device for holding a trigger in an active position, which can be accessed from either side of the tool body such that the tool is both left- and right-handed.

With the foregoing in mind, the present invention provides a lock-on, lock-off switch for a power tool, comprising a trigger movable in a first plane for completing and breaking a circuit to actuate and deactuate the tool, and a locking device movable in a second plane substantially perpendicular to the first plane between a first position in which the trigger is prevented from completing the circuit and a second position in which the trigger is held completing the circuit.

As will be appreciated, a switch according to the present invention is safer than the known prior art switches because its locking device prevents the trigger from being squeezed until the locking device is released. Hence, the power tool cannot inadvertently be switched on.

Preferably the locking device is biased into its first position. Thus, as soon as the trigger is released from its active position, the switch is automatically locked in its off position.

The locking device may be biased by means of a centrally mounted spring into its first position. Any other appropriate arrangement could, alternatively, be used for biasing the locking device into its first position.

If the locking device is in its second position, activation of the trigger preferably results in release of the locking device.

In a preferred embodiment, the locking device has two second positions, one on either side of the first position. As a result, the locking device is not handed, but is suitable for use by both right- and left-handed users.

In a preferred embodiment, the trigger and the locking device interact by means of a cam and cam follower. In such an arrangement, the cam is preferably formed on the trigger and the cam follower is formed on the locking device. In theory, however, the arrangement could be reversed.

Preferably the trigger includes a wall lying in the first plane which abuts the cam follower when the locking device is in first position to prevent completion of the circuit. More preferably the cam follower includes a dimple for assisting and retaining the locking device in its first position when the wall abuts the cam follower.

The cam may include a lip for holding the cam follower when the locking device is in its second position. Further, the cam follower preferably includes a nib which is held behind the lip of the cam when the locking device is in its second position.

The trigger is preferably biased into its inactive position.

According to another aspect of the present invention, there is provided a method of actuating a power tool using a switch as herein claimed, comprising the steps of:

- (a) urging the locking device in a first direction away from its first position, and
- (b) squeezing the trigger to complete the circuit and energise the tool, wherein if the trigger is released whilst locking device is being urged away from the first position, the power tool is held energised, and if the trigger is released after the locking device has been released, the power tool is switched off.

A specific embodiment of the present invention is now described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a schematic side view of a power drill incorporating a lock-on, lock-off switch according to the present invention;

Figure 2 is a sectional side view of the switch shown in Figure 1;

Figure 3 is a view, partly in section, in the direction III of Figure 2;

Figure 4 is a view in the direction IV-IV of Figure 2;

Figure 5 is a perspective view of the locking device shown in Figures 2 and 3.

With reference to the drawings, a power drill 1 comprises a trigger 3 and a locking device 5. The trigger 3 has a front face 7 which accommodates two depressions 7a, 7b for receiving fingers of a user (not shown). On the rear of the trigger 3 a recess 9 is formed for receiving a metal contact plate 11 which, when the trigger 3 is squeezed, completes a circuit within the body of the drill 1 to energise a motor of the drill 1.

The trigger 3 includes two side flanges 13 which are received in guide grooves (not shown) in the body of the drill 1 during squeezing of the trigger 3. In an alternative embodiment, the flanges 13 could, of course, be replaced by grooves which receive flanges formed on the body of the drill 1 itself.

A cam (or cam track) 15 is formed in the top of the trigger 3, as shown clearly in Figure 4 of the drawings.

The locking device 5, which includes a button 17 on either side of a frame 19, carries a cam follower 21 for interacting with the cam track 15 of the trigger 3.

As mentioned above, the trigger 3 is arranged to move in a first plane dictated by the flanges 13; the locking device 5 is arranged to move in a second plane substantially perpendicular to the first plane, if the user depresses one of the side buttons 17 which protrude from either side of the housing of the drill as shown in Figure 1.

The locking device 5 is biased into its central position, as shown in Figures 3 and 4, by means of a leaf spring (not shown), for example, which is accommodated through the frame 19. Hence, when the drill 1 is switched off and the trigger 3 and locking device 5 are at rest, the arrangement is as shown in Figures 2, 3 and 4.

If the trigger 3 is squeezed without touching the locking device 5, a wall 23 extending from the cam track 15 abuts the cam 21 of the locking device 5 and is centralised by means of a dimple 25 formed therein. Hence, the contact plate is prevented from completing the circuit and the drill 1 is not energised.

In order to energise the drill 1, it is necessary for one of the buttons 17 to be depressed prior to the trigger 3 being squeezed. If these actions occur, the cam 21 of the locking device 5 is positioned to one side of the wall 23, thereby allowing the trigger 3 to energise the drill 1. Further, if the trigger 3 is released whilst one of the buttons 17 is held depressed, a nib 27 of the cam 21 is received behind a lip 29 of the cam track 15, as shown in phantom lines in Figure 4 of the drawings. The trigger 3 is therefore held in its active position with the power drill 1 energised.

If the power drill 1 is to be turned off, it is simply necessary for the trigger 3 to be squeezed briefly to disengage the nib 27 from the lip 29. Having done this, the centralising force acting on the locking device 5 causes the cam 21 to move towards the wall 23, thereby resulting in the cam 21 reverting to its centralised rest position, as shown in Figures 2, 3 and 4.

Alternatively, if the drill 1 is energised and the locking device 5 is released whilst the trigger 3 is still being squeezed, the cam 21 will simply rest against a side of the wall 23 for as long as the trigger 3 is held squeezed. Once the trigger 3 is released, however, the cam 21 will revert back to its central rest position, such that the switch is locked off once again.

It will of course be understood that the present invention has been described above purely by way of example, and that modification of detail can be made within the scope of the invention.

Claims

1. A lock-on, lock-off switch for a power tool, comprising

a trigger movable in a first plane for completing and breaking a circuit to actuate and deactuate the tool, and

a locking device movable in a second plane substantially perpendicular to the first plane between a first position in which the trigger is prevented from completing the circuit and a second position in which the trigger is held completing the circuit.

2. A switch as claimed in claim 1, wherein the locking device is biased into its first position.

3. A switch as claimed in claim 1 or claim 2, wherein the locking device is biased by means of a centrally mounted spring into its first position.

4. A switch as claimed in any preceding claim, wherein the locking device is released from its second position when the trigger is activated.

5. A switch as claimed in any preceding claim, wherein the locking device has two second positions, one on either side of the first position.

6. A switch as claimed in any preceding claim, wherein the trigger and the locking device interact by means of a cam and cam follower.

7. A switch as claimed in claim 6, wherein the cam is formed on the trigger and the cam follower is formed on the locking device.

8. A switch as claimed in claim 7, wherein the trigger includes a wall lying in the first plane which abuts the cam follower when the locking device is in its first position to prevent completion of the circuit.

9. A switch as claimed in claim 8, wherein the cam follower includes a dimple for assisting in retaining the locking device in its first position when the wall abuts the cam follower.

10. A switch as claimed in any one of claims 6-9, wherein the cam includes a lip for holding the cam follower when the locking device is in its second position.

11. A switch as claimed in claim 10, wherein the cam follower includes a nib which is held behind the lip of the cam when the locking device is in its second position.

12. A switch as claimed in any preceding claim, wherein the trigger is biased into its inactive position.

13. A lock-on, lock-off switch for a power tool, substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

14. A method of actuating a power tool using a switch as claimed in any preceding claim, comprising the steps of

- (a) urging the locking device in a first direction away from its first position, and
- (b) squeezing the trigger to complete the circuit and energise the tool,

wherein if the trigger is released whilst the locking device is being urged in the first direction, the power tool is held energised, and if the trigger is released after the locking device has been released, the power tool is switched off.

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