

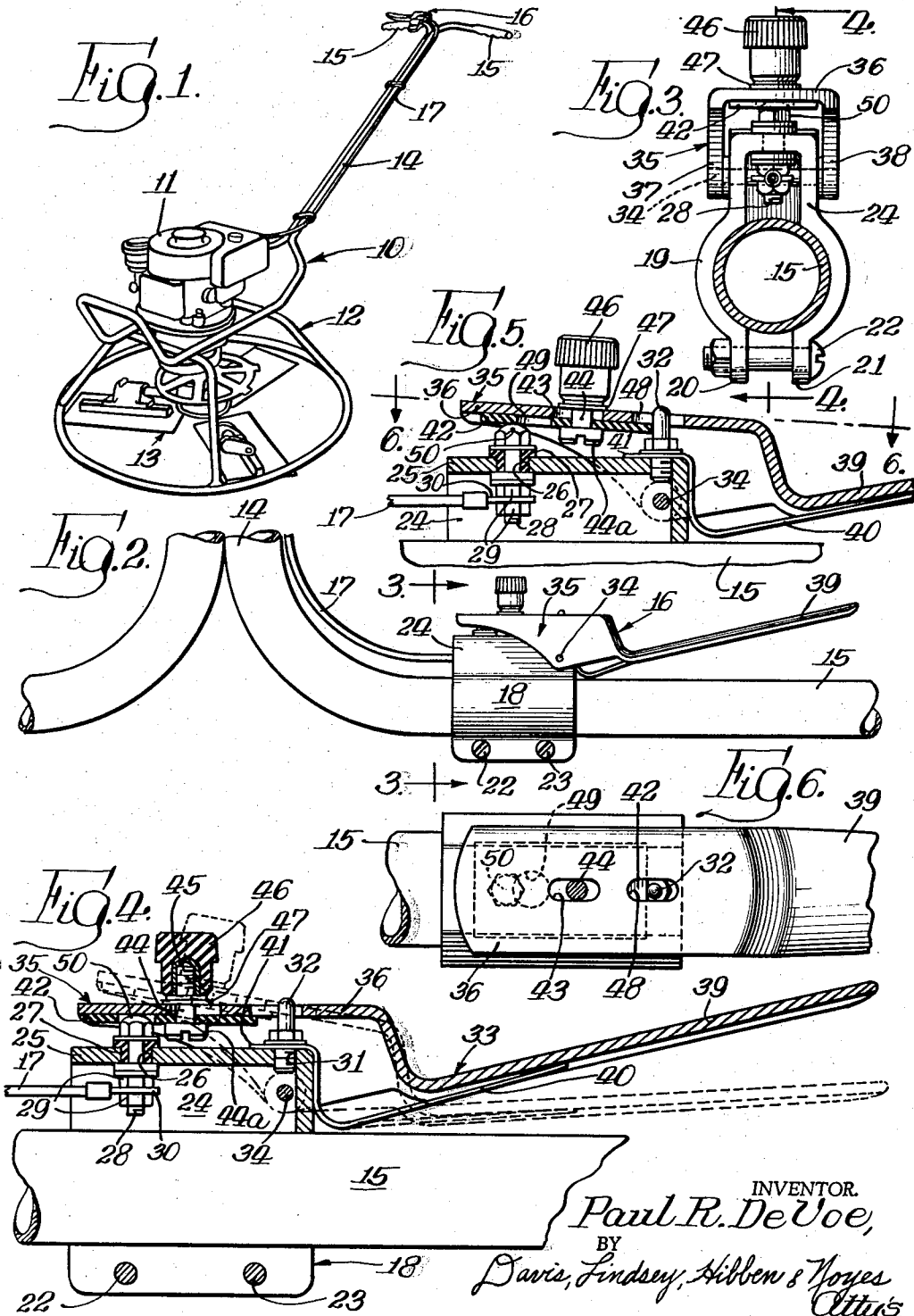
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SAFETY CONTROL SWITCH FOR POWER TOOLS

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SAFETY CONTROL SWITCH FOR POWER TOOLS
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This invention relates to safety controls and more particularly to a new and improved "dead man" control for power tools.

Power tools of the type operated by internal combustion engines are usually stopped by shorting the electrical system. Either the magneto or the spark plugs are grounded and this effectively causes a prompt stopping of the engine. Many power tools having large rotating masses must have constant attention to be safely operated. Thus, to further enhance safety of operation an operator is sometimes required to hold an element against the action of a spring whereby if the spring actuated element is released by the operator, the engine will automatically be halted. This is termed a "dead man" control.

The principal object of the present invention is to provide a novel and improved "dead man" control for power operated tools.

Another object of this invention is to provide a novel "dead man" control for power tools having means for manually setting the control to permit operation of the tool and means for automatically shorting out the engine upon the release of the operator's grip on the tool.

A further object of this invention is to provide a novel "dead man" control for power operated tools having means for manually setting the control in one position to permit starting of the power tool engine and thereafter upon the operator gripping the handle of the power tool the control is automatically reset to another position to cause prompt stopping of the engine upon release of the handle.

Other and further objects and advantages will become apparent from the following detailed description and accompanying drawing, wherein:

FIG. 1 is a small scale perspective view showing a power operated tool having the control of this invention mounted thereon;

FIG. 2 is an enlarged top plan view of a portion of the handle of the power operated tool of FIG. 1;

FIG. 3 is a sectional view taken on the line 3-3 of FIG. 2;

FIG. 4 is a sectional view taken on the line 4-4 of FIG. 3;

FIG. 5 is a sectional view similar to FIG. 4 but showing the mechanism in a different operating position; and

FIG. 6 is a top plan view with portions in section as seen along the line 6-6 of FIG. 5.

The reference numeral 10 indicates generally a cement trowelling tool selected to illustrate one embodiment of this invention. The power tool includes an internal combustion engine 11 which operates on fuel such as gasoline. The engine 11 is carried in a generally vertical position on a tubular metal frame 12, and beneath the engine 11 is mounted a rotor 13 of trowels. In using the power tool the device is moved over a freshly poured concrete surface such that the rotating trowels 13 work the surface of the concrete making it uniformly dense and smooth. The frame structure 12 is equipped with an upwardly and outwardly extending handle 14 whereby the trowelling device may be easily moved from place to place. The handle 14 is provided with hand-engaging lateral extensions 15 by which an operator may grip the handle and easily slide the machine over the concrete surface to be trowelled.

It should be understood that the device of this invention may be utilized with any power operated tool such

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as a lawn mower, floor polisher, or the like, and the invention should not be construed to be limited to a cement trowelling device.

A "dead man" control 16, which constitutes the device of this invention, is shown attached to one of the hand-engaging portions 15 of the handle 14 so that the operator may conveniently grip the control during the operation of the power tool. Internal combustion engines such as that shown at 11 in the drawing are accompanied by an electrical system to cause ignition and continued firing. In utilizing internal combustion engines on portable power tools the stopping of the engine is most conveniently accomplished by a shorting of the electrical system. Thus, if the engine magneto is shorted or the spark plugs are directly shorted there can be no further firing of the engine and it immediately ceases its operation. The present "dead man" control utilizes this principle for its operation.

The "dead man" control 16 is carried on a support 18 which includes a tubular central portion 19 which may be slidably mounted on one of the hand-engaging portions 15 of the handle 14. The support 18 further includes spaced apart downward extensions 20 and 21 which with the aid of bolt means 22 and 23 act to clamp the support in desired position on the power tool handle.

The support 18 further includes a rectangularly shaped housing 24 formed integrally above the handle clamping central portion 19. The rectangular housing 24 is provided with a top wall 25 having an opening 26 which carries an annular insulating bushing 27. An electrical contact post 28 is supported within the insulating bushing 27 and thus is electrically insulated from the metal top wall 25. Nuts 29 are shown threadedly engaging the bottom of the post 28 to provide means for attaching a terminal 30 of an electrical conductor or wire 17 to the post 28, the conductor 17 extending to the magneto or other appropriate portion of the electrical system of the engine. The top wall 25 is provided with a threaded hole 31 which receives a cooperatively threaded fixed pin 32 in spaced relation from the post 28. Preferably, the pin 32 is located directly adjacent and extends radially outwardly from the fulcrum 34.

An operating lever 33 for the "dead man" control is pivotally mounted on the housing 24 by a fulcrum pin 34. The lever 33 includes an inverted U-shaped end portion 35 having a top 36 and downwardly depending spaced apart sides 37 and 38 which flank the housing 24 at one side of the fulcrum pin 34. The lever 33 also includes an outwardly extending end portion 39 located at the other side of the fulcrum pin 34. A generally Z-shaped spring 40 is disposed intermediate the lever portion 39 and the housing 24 with one end 41 of the spring 40 clamped beneath the threaded pin 32. Thus, the spring 40 normally urges the outer end 39 of the lever 33 away from the hand-engaging portion 15 of the power tool handle. Similarly, the inner end portion 35 of the lever 33 is normally spring-biased downwardly toward the housing 24.

An insulator plate 42 is slidably mounted within the U-shaped end 35 of the operating lever 33 at a location against the under-side of the top 36. As best shown in FIG. 6, the top 36 of the lever portion 35 is equipped with a first elongated slot 43 which receives a screw 44 extending upwardly through the insulator plate 42 and having a head 44a and an upwardly projecting threaded end 45 which mounts a knurled hand knob 46. A washer 47 disposed around the screw 44 and beneath the knob 46 engages the top 36 and acts as a guiding means to permit sliding of the assembly of insulator plate 42 and knob 46 from one end to the other of the elongated slot 43 and also acts as a frictional means to retain the plate 42 in any desired position. A second elongated slot 48 is

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also provided in the top 36 of the lever portion 35 at a position spaced from but in general longitudinal alignment with the first elongated slot 43 for receiving the upwardly projecting pin 32.

A hole 49 is provided in the insulator plate 42 at a position generally above the electrical contact post 28, the post 28 having a rounded head 50 which, in one position of the insulator plate 42 (FIG. 4), is adapted to extend through the hole 49 and engage the metal top 36. It will be understood that the operating handle 33, and thus its top 36, is electrically grounded to the supporting structure through the fulcrum connection 34. In another position of the insulator plate 42 (FIG. 5), the contact head 50 of the post 28 abuts the under-side of the insulator plate 42 and thus is prevented from engaging and making electrical contact with the metal top 36.

During starting of the engine 11, the control device has a provision for manually avoiding the shorting out of the engine for the period required to start the engine. This is done by depressing the lever portion 39 slightly so that the opening 49 in the insulator 42 clears the head 50 of the post 28 and then manually sliding the insulator plate 42 by means of the knob 46 to the right, as shown in FIGS. 5 and 6, such that one end of the insulator plate 42 is interposed between the head 50 and the top 36 of the lever portion 35. The opposite end of the insulator plate 42 now has effectively shortened the elongated slot 48 in the top 36 and engages the pin 32. This same position of the control device may also be utilized when the operator desires to remove his hands from the tool but leave the engine idling.

After the engine has been started or it is desired to resume use of the tool after an idling period, the operator grips the handles 15 and also the lever portion 39 and in so doing squeezes the lever portion 39 toward the handle 15 against the action of the spring 40. This movement causes the fixed pin 32 to push or cam the insulator plate 42 end-wise to the left, as shown in dotted lines in FIG. 4, to a position where the hole 49 in the insulator plate 42 is positioned directly over the contact head 50 of the post 28. Now, but for the fact the inner end 35 of the operating lever 33 is spaced upwardly away from the contact post head 50, there would be a shorting out of the engine 11. Thus, operation of the engine may continue uninterruptedly as long as the operator grips and holds the lever portion 39 against the tubular handle 15 of the power tool in the dotted line position of FIG. 4. However, immediately upon the operator relaxing his grip on the spring-biased operating lever 33, the U-shaped end 35 swings down into position adjacent the housing portion 24 thus causing the contact head 50 to engage the metal top 36 and short out the engine, as shown in full lines in FIG. 4. When the actuating lever 33 is swung about its fulcrum 34, the pin 32 moves across substantially the full elongated extent of the opening 48. Thus, when the elongated opening 48 has been foreshortened by a repositioning of the insulator plate 42 over a portion thereof, then subsequent pivotal movement of the lever 33 will effect camming engagement of the insulator plate 42 by the pin 32 so as to move the insulator plate 42 substantially away from its position underlying the elongated slot 48. The cam pin 32 is retained within the confines of the slot 48 during pivotal movement of the lever 33 by reason of the location of the pin 32 in radial alignment with the pivot axis or fulcrum 34 of the lever.

In the full line position of the control as shown in FIG. 4, the engine 11 can not operate since the electrical system is shorted by reason of the contact of the head 50 of the electrical contact post 28 with the metallic top 36 of the actuating lever 33 which is electrically joined to the frame supporting structure 12 of the power tool. When the control is manipulated to the position shown in FIG. 5, as described above, the engine 11 may be

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started or allowed to idle. Thereafter, when the operator grasps the handles 15 and the lever 33 he automatically causes the outer end 39 of the lever 33 to be pulled against the handle 15 of the tool so as to shift the control mechanism to the dotted line position of FIG. 4. In this position, the "dead man" control is cocked or set such that when the operator completes his use of the power tool or for some reason is taken away from his position of engagement with the handles 15, the device is automatically restored to the full line position of FIG. 4 and the engine 11 is automatically shorted causing it to cease operation.

I am aware that numerous details of construction may be varied throughout a wide range without departing from the principles disclosed herein and I therefore do not propose limiting the patent granted hereon otherwise than as necessitated by the appended claims.

I claim:

1. A control for an engine comprising a support, an operating lever pivoted to said support, spring means normally urging one end of said lever away from said support and simultaneously urging the opposite end of said lever toward said support, electrical contact means insulatably mounted on said support and adapted to be engaged by said opposite end of said lever for shorting the engine, an insulating member movably carried on said lever for movement between first and second positions whereby in said first position the electrical contact means is adapted to engage and make electrical contact with said lever and in said second position said insulating member is interposed between said electrical contact means and said lever, manual means for shifting said insulating member from the first position to the second position, and means responsive to pivotal movement of said lever to effect movement of said insulating member from said second position to said first position.

2. A device as set forth in claim 1 in which said insulating member is longitudinally slidably supported on said opposite end of said lever.

3. A device according to claim 1 wherein said insulating member is provided with an aperture through which said electrical contact means is adapted to extend for engaging said lever in said first position of said insulating member.

4. A device as set forth in claim 3 wherein said lever is provided with an elongated slot and said means responsive to pivotal movement of said lever includes a pin fixed to said support and extending through said elongated slot, said insulating member in said second position thereof projecting over a portion of said elongated slot whereby when said lever is pivoted against the action of said spring means said pin pushes the insulating member from its second position to its first position.

5. A control for an engine having an electrical ignition system, comprising a metal support, a metal lever pivoted on said support, an insulator member slidably carried on said lever and operable when in one position to permit grounding of said ignition system through said lever and said support to stop said engine, said insulator member being operable when in another position to prevent grounding of said ignition system, and means including a cam element fixed to said support and disposed closely adjacent said insulator member, said cam element being adapted to engage said insulator member in response to pivotal movement of said lever in one direction for effecting a shifting of said insulator member in a direction toward said one position.

6. A control for an engine operated tool, comprising a support mountable on the tool, an electrical contact post fixed to said support and insulated therefrom, a pin fixedly mounted on said support in spaced relation from said post, a lever pivotally mounted intermediate its ends on said support, spring means coacting with said support and said lever for normally urging one end portion of said lever away from said support and the opposite end

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portion of said lever toward said support, an insulating member slidably mounted on said opposite end portion of said lever between the latter and said support, and means for manually shifting said insulating member, said insulating member having an opening therein such that in one position thereof said opening is aligned with said electrical contact post and in another position thereof said insulating member is interposed between said electrical contact post and said opposite end portion of said lever, said opposite end portion of said lever having an elongated slot through which said pin projects and said insulating member in said other position thereof overlying a portion of said slot in close proximity to said pin, whereby when the lever is pivoted against the action of the spring, said pin engages the insulating member to move the same to said one position thereby aligning the opening therein with the electrical contact post for effecting engagement of said electrical contact post with said opposite end portion of said lever when the lever is released and returned to its original position by said spring.

7. A control for an engine with an electrical system comprising a support, a lever pivoted on said support, an electrical contact on said support, an insulator movably mounted on said lever, said insulator in a first position thereof permitting contact of said electrical contact with said lever and said insulator in a second position thereof being disposed between said electrical contact and said lever, manual means for shifting said insulator from its first position to its second position, and means re-

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sponsive to pivotal movement of said lever to cause said insulator to move from its second position to its first position.

8. A device as set forth in claim 7 in which spring means is positioned intermediate said lever and said support to normally urge the portion of said lever carrying said insulator toward said support.

9. A device as set forth in claim 7 in which said means responsive to pivotal movement of said lever comprises means on said lever defining an elongated slot therein, and stationary abutment means projecting from said support into said slot whereby pivotal movement of said lever causes said abutment means to engage and move said insulator from its second position to its first position.

10. An engine control comprising a support, a lever pivotally mounted on said support, an insulator member slidably carried on said lever, an electrical contact member mounted on said support, said insulator member in one position thereof permitting engagement of said electrical contact member with said lever and in another position thereof preventing engagement of said electrical contact member with said lever, and means coacting between said support and said lever for effecting a shifting of said insulator member in response to pivotal movement of said lever.

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