United States Patent [19]

Lay

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[54] **POWER TOOL SAFETY LOCK DEVICE FOR MANUAL SWITCH WITH SWITCH ACTUATOR INTERLOCK STRUCTURE DEFEATEDLY RELEASED BY CHUCK KEY**

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[73] Assignee: **McGraw-Edison Company**, Elgin, Ill.

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[21] Appl. No.: **308,417**

[52] **U.S. Cl.** ..... **200/61.58 R**, 200/42 R, 200/44, 200/52 R, 200/169 R

[51] **Int. Cl.** **H01h 27/06**

[58] **Field of Search** ..... 200/42 R, 44, 52 R, 200/50 A, 61.58 R, 169 R, 172 R; 279/1 K

[56] **References Cited**

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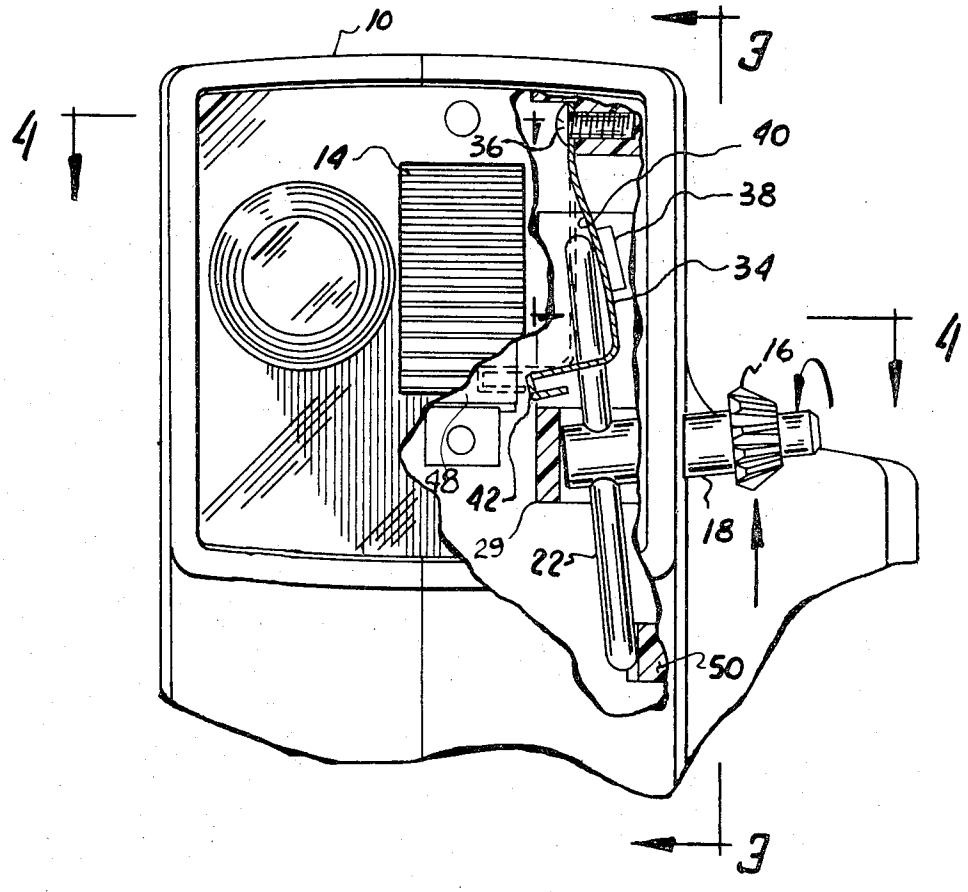
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[57] **ABSTRACT**

A safety arrangement for a power tool having a tool holding chuck and a key with transversely disposed pinion and handle portions for tightening and loosening the chuck and having a control switch and an operating member therefor that is shifted between spaced positions corresponding to the on and off conditions respectively of the power tool, the combination of the tool casing having a slot adjacent the switch which slot is adapted to receive the key handle portion with the pinion portion then being exposed, a casing wall located adjacent the slot allowing rotation of the inserted key in one direction only, a leaf spring supported by the casing with a cantilevered portion located adjacent the positioned key handle portion and further having a tab formed on the spring and located adjacent the operation member, the spring tab operating under the normal bias of the spring when no key is in the unit to interfer with the operating member thereby precluding shifting of same from the off position to the on position, and the key handle portion operating when positioned in the slot and upon key rotation to displace the spring tab from interference with the operating member thereby allowing shifting of the operating member for desired operation of the power tool.

4 Claims, 4 Drawing Figures



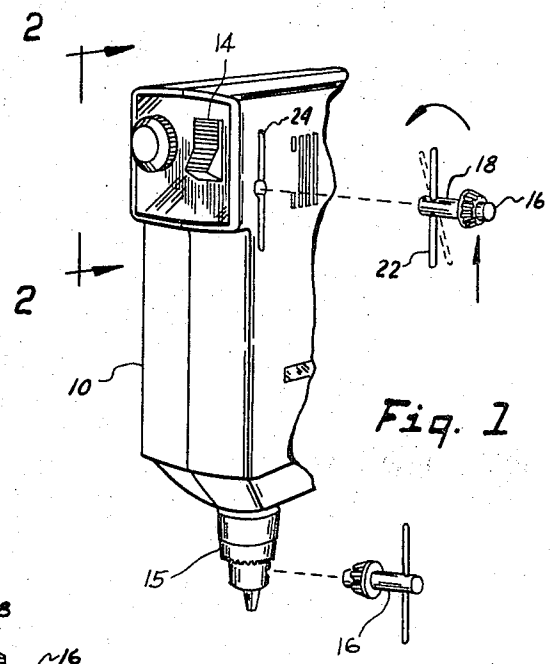


Fig. 1

Fig. 4

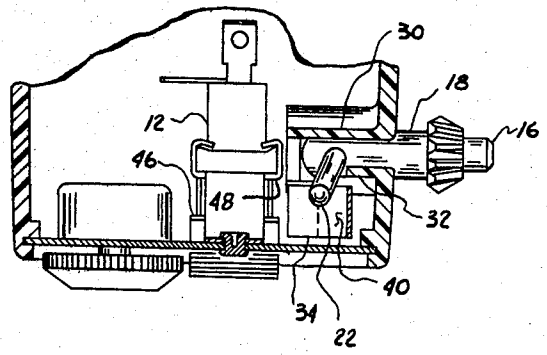


Fig. 2

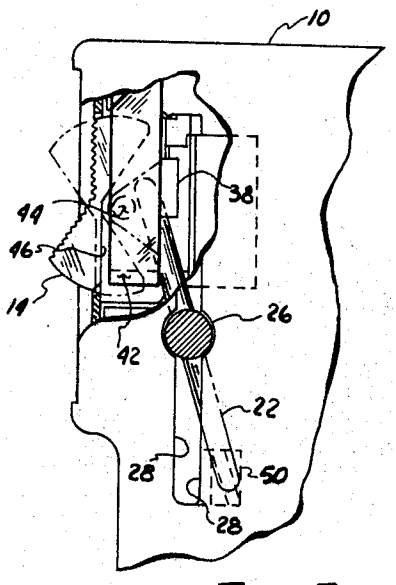
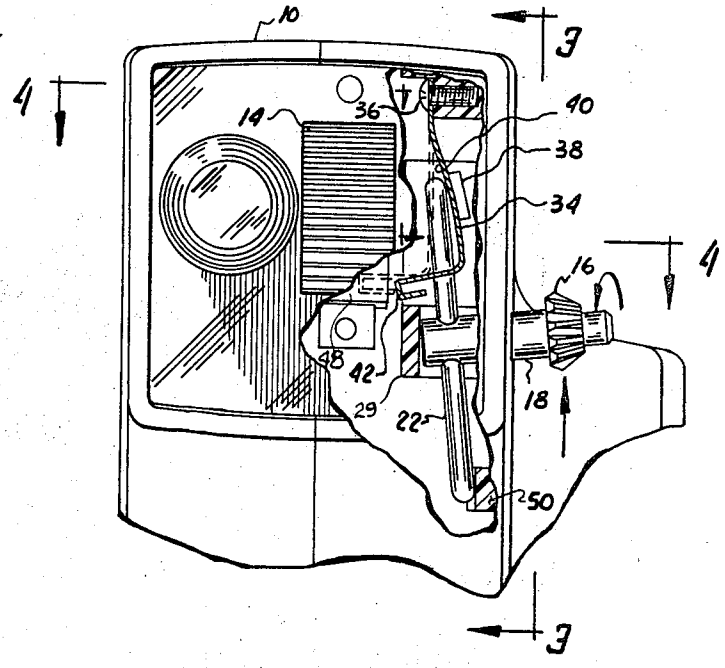


Fig. 3



POWER TOOL SAFETY LOCK DEVICE FOR MANUAL SWITCH WITH SWITCH ACTUATOR INTERLOCK STRUCTURE DEFEATEDLY RELEASED BY CHUCK KEY

The subject invention relates to a safety arrangement for a power tool particularly one that incorporates a chuck key for tightening and loosening a tool gripping chuck formed as the powered output of the unit. The main object of this invention to preclude the operation of the tool at all times other than when the key for operating the chuck is positioned in a particular manner relative to the tool, thereby minimizing the likelihood of injury to the operator caused by accidental starting of the tool if and when the operator were fitting the tool in the chuck or afterwards if the key might have been left in the chuck. The invention provides a normally spring biased obstruction that interfers with the operation of the on-off switch member unless the safety key is inserted into a particular opening on the tool and manipulated to shift the obstruction from the interfering position, thereafter allowing switch operation without restriction.

This invention and the advantages thereof will be more fully understood and appreciated after referring to the following drawing, wherein:

FIG. 1 is a perspective view of the control plate and casing of a power tool where an on-off switch is shown as well as the particular key receiving slot and safety switch arrangement;

FIG. 2 is a front elevational view of the arrangement shown in FIG. 1 as seen from line 2—2 generally, except with part of the tool casing broken away for clarity of disclosure;

FIG. 3 is an elevational view as seen generally from line 3—3 in FIG. 2, again with part of the tool casing broken away; and

FIG. 4 is a sectional view as seen generally from line 4—4 in FIG. 2.

Referring to the drawing, a housing **10** is shown which can be of most any power tool, but which is shown as the power drill press disclosed in my patent application Ser. No. 308,416 entitled Variable Speed Drill Press, filed Nov. 21, 1972. The housing **10** supports an on-off switch **12** including an actuating member **14** supported to move between two positions corresponding to the on and off conditions of the power tool. The tool has a powered output chuck **15**, and key **16** is used to tighten and loosen the chuck to hold the cutting bit (not shown) as is well known. The key has a pinion shaft **18** including a pinion thereon adapted to be set relative to the chuck, and a handle **22** is connected crosswise to the shaft **18** to allow the application of a twisting force on the shaft without the need of any auxiliary tools.

Located in the side wall of the housing **10** is a slot **24** having an enlarged central portion **26** adapted to receive the pinion shaft **16** and of length at the ends **28** to receive the handle **22.** A housing stop **29** lined up with the pinion shaft limits axial insertion of the key, and further a housing wall **30** adjacent the rear side of the top end of the slot precludes rotation of the inserted key in the clockwise direction (relative to FIGS. **1** or **3**) and housing wall **32** adjacent the enlarged central opening **26** and extended also partially along the slot opposite the wall **30** requires that the key be fully inserted into slot and centered slightly counterclockwise

(relative to FIG. **2**) before it can be rotated in the counterclockwise direction (relative to FIGS. **1** or **3**).

A leaf spring **34** is mounted as by screw **36** to the housing and is cantilevered in adjacent but spaced parallel proximity to the wall **30** and furthermore has a slanted lead on cam edge **38** which in the normal or unflexed position of the spring (phantom in FIG. **2**) is positioned beyond the extension of the wall **32.** Consequently upon insertion of the key and proper canting and rotation of same, the top part of the key handle rides onto the cam member **38** and then over the inward faces of the spring and thus deflects the spring as indicated in FIG. **2.**

In the illustration, the actuating member **14** pivots about pin **44** and has a rear face **46** which is adapted to move toward and away from a fixed wall **48** of the switch housing. The free end of the leaf spring has a tab or projection **42** which is adapted normally to fit between the switch wall and the rear face **46** of the actuating member **14** when the switch is in the off position, and when so fitted therebehind, precludes the pivoting of the switch member about its pin **44.** As noted above, upon insertion of the key **16** into the key slot **24** and key rotation to ride the upper handle member over the cam edge **38** of the spring **34,** the projection **42** is displaced in a direction from behind the rear face **46** of the actuating member and consequently the actuating member can be shifted to its opposite position as desired. The lower handle portion of the key rides onto a small inwardly raised and notched detent face **50** formed on the tool housing as the key is rotated. This is effective both to back cant the key slightly (clockwise as seen in FIG. **2**) for increases spring deflection to remove it completely from interference with the actuating member **14** and to hold the secured key secure to preclude accidental shifting caused by vibration when the power tool is in operation.

I claim:

1. A safety arrangement for a power tool having a control switch and an operating member therefor that is shifted between spaced positions corresponding to the on and off conditions respectively of the power tool, the combination of a key member and the tool casing having a slot adjacent the switch which slot is adapted to receive a portion of the key member, casing wall means located adjacent the slot allowing rotation of the inserted key member in one direction only, a leaf spring supported by the casing with a cantilevered portion located adjacent the positioned key portion and further having a tab formed on the spring and located adjacent the operation member, the spring tab operating under the normal bias of the spring when no key is in the unit to interfere with the operating member thereby precluding shifting of same from the off position to the on position, and the key portion operating when positioned in the slot and upon key rotation to displace the spring tab from interference with the operating member thereby allowing shifting of the operating member for desired operation of the power tool.

2. A power tool safety arrangement according to claim **1,** wherein the tool member has a tool holding chuck and wherein the key member has transversely disposed pinion and handle portions for tightening and loosening the chuck, and wherein the key handle portion is adapted to be inserted into the slot with the key pinion portion then yet being exposed outside of the casing.

3. A power tool safety arrangement according to claim 1, further including additional casing wall means located adjacent the slot requiring a slight canting of the key member relative to the direction of insertion into the slot before the inserted key member can be rotated in the one direction.

4. A power tool safety arrangement according to claim 3, further including still additional casing wall means located adjacent the slot serving the dual purpose of slightly return canting the inserted and rotated key member and of detenting the inserted and rotated key member in said position.

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