Jan. 19, 1960 R. J. O'MARA 2,922,012

SWITCH TRIGGER LOCKING PIN

Filed Nov. 22, 1957

Fig. 1

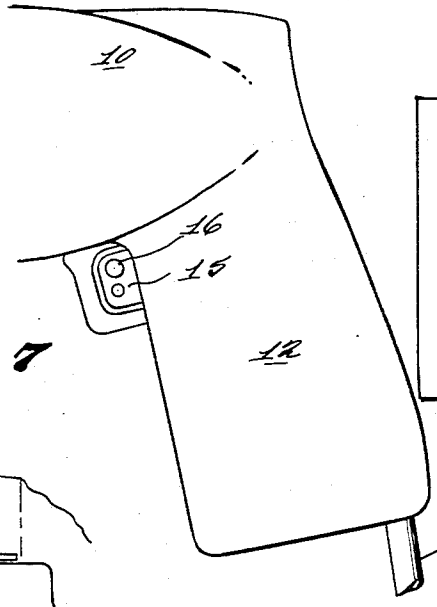


Fig. 7

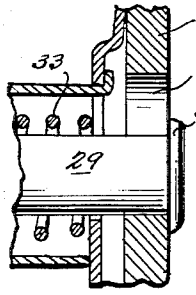


Fig. 6

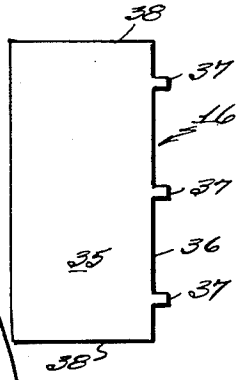


Fig. 2

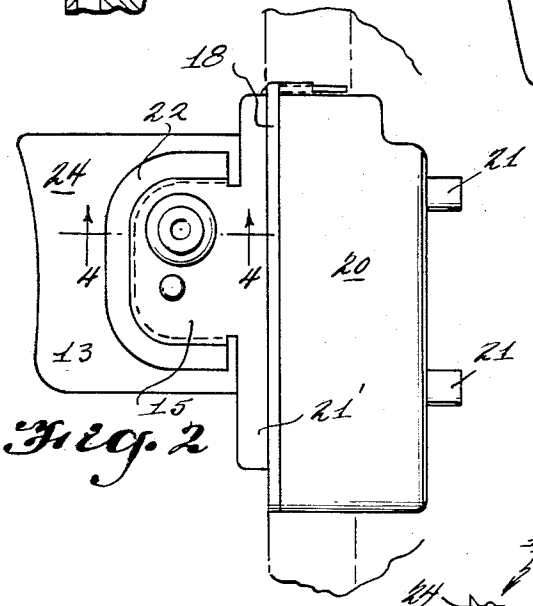


Fig. 3

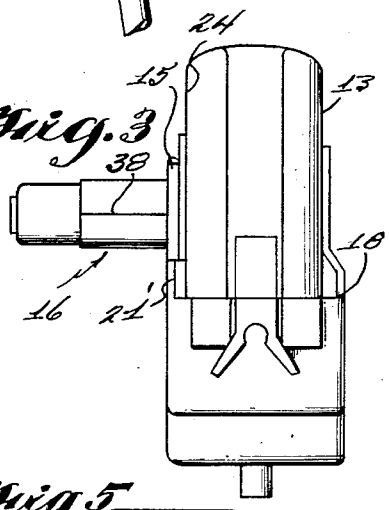


Fig. 5

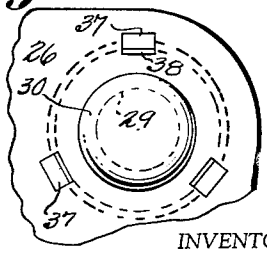
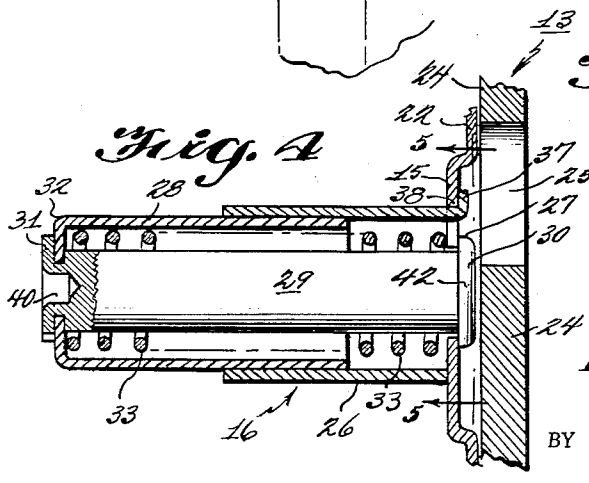


Fig. 4



INVENTOR

ROBERT J. O'MARA

BY Leech & Radue

ATTORNEYS

United States Patent Office 2,922,012 Patented Jan. 19, 1960

2,922,012

SWITCH TRIGGER LOCKING PIN

Robert J. O'Mara, Liverpool, N.Y., assignor to Pass & Seymour, Inc., Syracuse, N.Y., a corporation of New York

Application November 22, 1957, Serial No. 698,139

3 Claims. (Cl. 200—157)

This invention relates to locking pin assemblies and more particularly to locking pins arranged for use with trigger switches.

It is a general object of the present invention to provide a novel and improved locking pin assembly.

More particularly, it is an object of the present invention to provide a locking pin assembly the parts of which are all made with extremely simple tools and do not require the use of so-called screw machine operations or like practices, whereby the over-all cost is substantially reduced without in anywise reducing the efficiency, effectiveness or appearance of the article.

It is an important object of the present invention to provide a locking pin assembly of the type used for maintaining a trigger switch in one of its circuit controlling positions after it has been retracted by an operator, and in which the parts and mounting means are simple sheet metal parts and a solid rivet.

Other and further objects and features of the invention will be more apparent to those skilled in the art upon consideration of the accompanying drawing and following specification, wherein is disclosed a single exemplary embodiment of the invention together with illustrations of its use in connection with a trigger switch, it being understood that such changes and modifications may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawings:

Fig. 1 is a side elevation of the pistol grip and trigger portion of a motorized tool, showing mounted beside the trigger a locking pin constructed in accordance with the present invention for securing the trigger in the retracted or circuit-closing position;

Fig. 2 is a side elevation on an enlarged scale of the trigger, its locking pin and the associated switch for control by the trigger, which switch is housed within the handle shown in Fig. 1;

Fig. 3 is a top plan view of the showing of Fig. 2;

Fig. 4 is a horizontal section on an enlarged scale taken on line 4—4 of Fig. 2 showing only the locking pin assembly;

Fig. 5 is a view of the rivet head end of the locking pin assembly taken on line 5—5 of Fig. 4;

Fig. 6 is plan of a sheet metal blank from which the guide sleeve is formed; and

Fig. 7 is a fragmentary view similar to Fig. 4 but showing the pin in trigger holding relationship.

In many industries there is a demand for a longitudinally reciprocable, spring-retracted locking pin of simple form and relatively small size but heretofore such devices have been of complex construction requiring the use in the assembly of one or more so-called screw machine parts, i.e. parts made from solid rod or the like having sections of different diameters achieved by the equivalent of turning operations in automatic screw machines. Not only is this process wasteful of material, and many of these locking pins must be of non-ferrous substances, but

the time consumed and the expense involved makes the mechanism too costly for many uses.

As an example may be mentioned the use of a locking pin for the trigger which operates the switch of a hand tool. It is highly desirable in small motor driven drills, saws and similar tools to be able to lock the trigger in its retracted position so that the operator may put his trigger finger to better use in guiding the tool.

As an example of the use of such a locking pin reference may be had to Fig. 1 of the drawing where **10** represents the motor of a portable power tool and **12** a handle adapted to be grasped by the user. At **13** is shown a trigger slidably mounted at the upper part of the handle and adapted, when retracted, to close the electric circuit from the cable **14** to the motor. The trigger is returned by a substantial spring, not shown, and to hold it for long periods of time becomes exceedingly tiresome and besides the trigger finger may be put to better use in guiding the tool for precise work. To lock the trigger in a retracted position there is provided closely adjacent one side wall of it a side rail mounting a plate **15** which supports a longitudinally slidable locking pin **16** extending through the plate and headed there to be received in a hole in the side wall of the trigger when the latter is in retracted position. The head then projects through the trigger side plate and if the latter is then released it retracts a small amount when the edge of the hole therein engages the locking pin, which latter may then be released since the inner edge of the head thereon engages the inner wall of the plate to prevent it from being withdrawn whereby it holds the trigger in circuit closing position.

To release the trigger it is only required to pull the trigger the small amount necessary for the edge of the hole to clear the locking pin head, which is then withdrawn by its own spring so the trigger may be released to open the circuit.

Figs. 2 and 3 show the trigger **13** mounted for reciprocation through cover plate **18** for actuating mechanism, not shown, within switch **20** having terminals **21**. The cover plate is provided with integral side rail **21'** from which plate **15**, previously referred to, extends. It has a U-shaped sunken border **22** which substantially engages the contiguous flat wall **24** of the trigger to act as a guide and prevent lateral wobbling thereof. The trigger, as shown, may be a molded plastic part.

The main or raised portion of plate **15** provides clearance for those locking pin assembly parts which extend onto the trigger side of plate **15** as disclosed in Figs. 4 and 5. In the side wall **24** of the trigger is opening **25** which in the extended or normal position of the trigger is spaced as shown in respect to the locking pin axis assembly thereon, as seen in Fig. 4. When the trigger is pulled to close the circuit it moves downward as seen in Fig. 4 until the opening **25** is aligned with the center of the locking pin so that the latter may be projected by thumb pressure into this opening to lock the trigger in the "On" position.

For a better understanding of the locking pin construction reference is had to Figs. 3, 4, 5 and 6 where the assembly includes side plate **15**, cylindrical sleeve **26** secured thereto in coaxial arrangement with the circular hole **27**, eyelet or tube **28** arranged in telescopic relation to and for guidance by sleeve **26**, solid rivet **29** extending through the hole **27**, headed on the trigger side of the plate **15** as at **30** and having its upper end riveted over as at **31** after passing through a central aperture in the partially closed end **32** of eyelet **28**.

The spaced-coil helical spring **33** surrounds the shank of the long rivet and bears at one end on the annular area of plate **15** within the sleeve **26** and at its other on portion **32** of eyelet **28** and exerts sufficient pressure to maintain

the assembly in the relative arrangement of parts seen in Fig. 4.

Consider now the details of the components of the locking pin assembly. Plate **15** with its border **22** is an integral part of rail **21** and has already been described in detail. Sleeve **26** is formed from a simple piece of sheet metal rectangular in form as shown at **35** in Fig. 6 and has on one of its long edges **36** the integral tabs **37**. This blank is curled into a cylinder with ends **38** abutting as seen in Fig. 3. Tabs **37** are extended through circumferential slots **38** arranged about and spaced from the periphery of hole **27** in plate **15** through which the rivet passes. Thus when assembled and with the tabs turned outwardly as clearly illustrated in Fig. 4, the sleeve **26** is positioned normal to the face of plate **35** and coaxial with hole **27** therein.

Rivet **29** has a long straight shank sized to be guided in hole **27** for sliding movement. Head **30** is upset thereon in the usual manner and is of somewhat greater diameter than hole **27** to remain positioned on the trigger side of plate **15**. After it has been so positioned its shank is surrounded by the coils of spring **33**.

The eyelet or tube **28** may either be made by curling up a flat plate into a cylinder, as in the case of sleeve **26**, and turning in end **32** or the whole thing may be drawn or stamped in a single operation with exceedingly simple dies. This permits a better centering of the hole which receives the reduced diameter end of the rivet, which may be effected by a rolling operation requiring no cutting. This end is provided with central hole **40** tubularizing it to facilitate the upsetting operation, shown at **31**, after the eyelet has been assembled over it and the upper end of the spring and is telescoped into the sleeve **26**. This completes the assembly and holds the parts with the inner end of the eyelet spaced from plate **15** a distance greater than that necessary for movement to project head **30** through the trigger wall to assume the position illustrated in Fig. 7 when the trigger is pulled and then locked. Here the hole **25** in the wall **24** of the trigger has been drawn down, first a sufficient distance to be substantially concentric with head **30** of rivet **29** which is then projected through opening **25** while holding the trigger retracted. After the rivet passes through opening **25** the trigger is released and on tending to be returned by its spring the lower wall of opening **25** engages the rivet shank with a portion of the rivet head **30** overhanging the inner face of trigger wall **24** preventing spring **33** from retracting the locking pin, and holding the trigger in its "pulled" position. To release the locking pin from the trigger the latter is pulled slightly to separate the inner face of wall **24** from overhang, when the retractile spring for the locking pin withdraws the same and the trigger can then be released to open the switch.

It will be seen that the locking pin assembly is constructed wholly of parts which do not require any machine operations in the nature of turning or the like, and that all of the parts are made either by simple stamping or upsetting operations from flat sheet metal and straight rod. Under these circumstances the cost is materially reduced and the time of manufacture and assembly substantially shortened. At the same time the price is kept extremely low.

Having thus described my invention, what I claim as novel and desire to secure by Letters Patent of the United States is:

1. A spring retracted locking pin assembly mounted on a sheet metal plate having a hole therein comprising in combination a straight walled, rolled, cylindrical sleeve having integral tabs at one end extending through openings located in said plate to position the sleeve coaxial with said hole and spaced outwardly from the edges thereof, a straight walled, sheet-metal eyelet telescoped with said sleeve and having its free end turned inwardly to leave a central opening, an open coil helical spring having one end abutting said plate within the sleeve and the other end within the eyelet and abutting said free end, an elongated solid rivet sized to slide loosely in the hole in said plate and through said spring, a head on said rivet larger than said hole normally abutting the plate on the side opposite said sleeve, the remote end of the rivet having a rolled shoulder abutting the turned in end of the eyelet and a portion extending through the center thereof and riveted over to hold the parts assembled.

2. A self-retracting locking pin assembly for mounting on a thin plate having a hole therein and a plurality of slots spaced outwardly from the periphery thereof, a rectangular sheet of metal having tabs extending from one long edge thereof and sized to each fit one of said slots, said strip being curled into a cylindrical sleeve larger in diameter than said hole and having said tabs extending through said slots and bent over beneath the plate, a solid rivet sized to and extending freely through said hole and having a head normally abutting the plate about the hole periphery on the opposite side from the sleeve, a helical spring of the open coil type loosely surrounding the rivet and having one end abutting the plate within the sleeve, a tube telescoping with said sleeve and spring and being shorter than said rivet, said tube having its outer end at least partially closed and abutting and compressing said spring, and means securing the said outer end of the tube and the outer end of the rivet together to hold the parts assembled.

3. The assembly as defined in claim 2 in which said plate has an area offset from its general plane in the direction of said sleeve a distance no less than the thickness of said rivet head, said area including said hole and slots.

References Cited in the file of this patent

UNITED STATES PATENTS

2,487,011	Wilhide	Nov. 1, 1949
2,744,176	Kaman	May 1, 1956