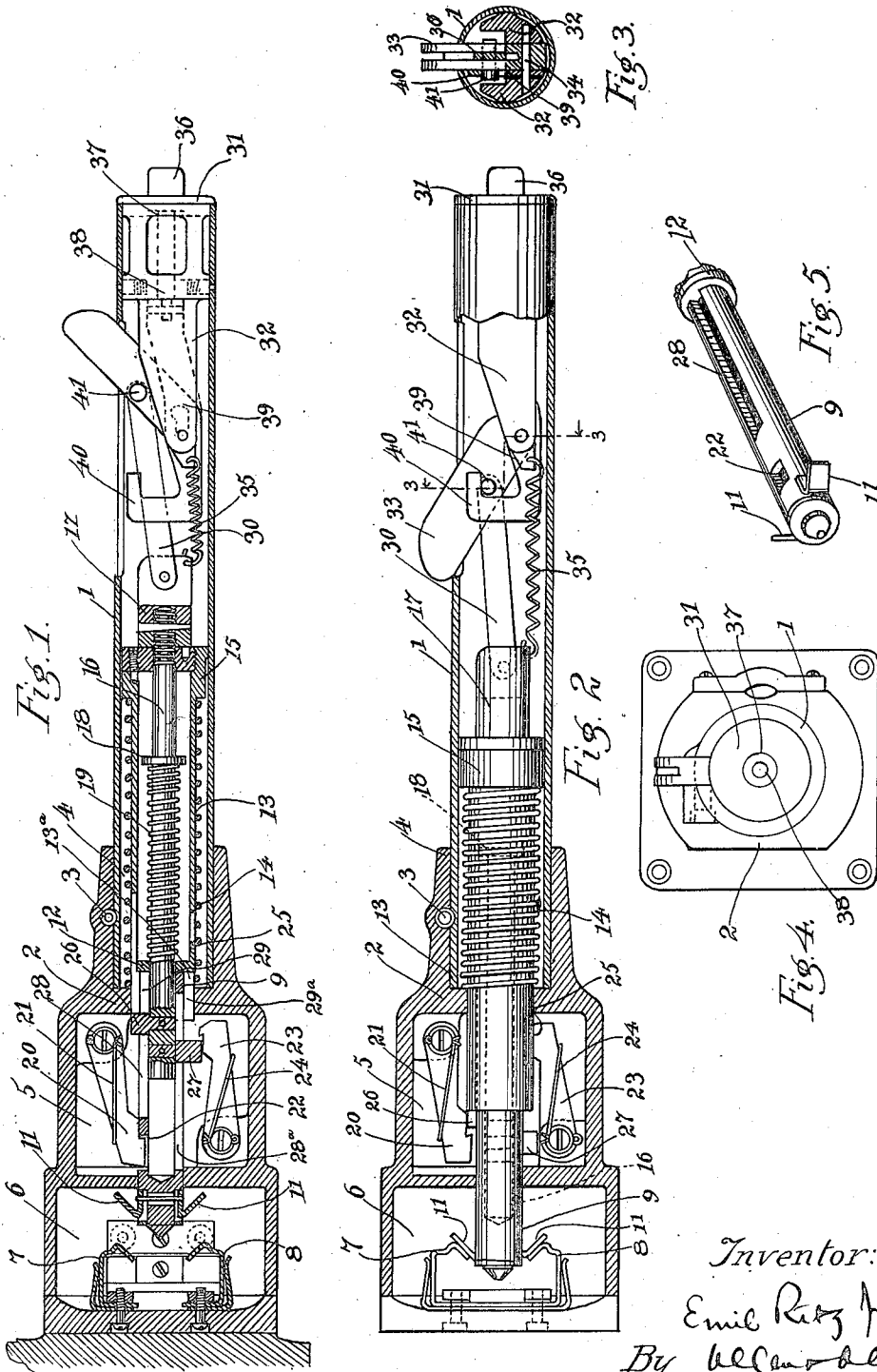


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 QUICK THROW ELECTRIC SWITCH.
 APPLICATION FILED APR. 29, 1918.

1,380,595.

Patented June 7, 1921.



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UNITED STATES PATENT OFFICE.

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QUICK-THROW ELECTRIC SWITCH.

1,380,595.

Specification of Letters Patent.

Patented June 7, 1921.

Application filed April 29, 1918. Serial No. 231,329.

To all whom it may concern:

Be it known that I, EMIL RITZ, Jr., a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Quick-Throw Electric Switches, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to quick throw electric switches particularly where adapted for use with portable electric tools. In the switches of the quick throw type with which I am familiar, the structural details are such as to result in complicated and ineffective devices. The opening and closing of the switches have not, so far as I am informed, been made in a straight line. The devices have not had any strength to the throw, and have not stood up well.

It is the object of my invention to provide a new quick throw switch wherein the motions are all in a straight line, and but few parts are involved in the throwing of the switch mechanism. It is also my object to get away from a multitude of small parts and make the switch throwing parts large, so as to give longer life to the parts and permit of stronger and more positive action. By making the throw in a straight line the closing and opening of the switch is more abrupt than in knife blade switches of the types with which I am familiar.

Other various features of convenience in operation and adaptability to various uses, will be pointed out below, and these objects and advantages together with those above noted I accomplish by that certain construction and arrangement of parts to be hereinafter more specifically pointed out and claimed.

In the drawings,

Figure 1 is a longitudinal section through the center line of the switch showing the same in retracted or open position.

Fig. 2 is a like view, with the moving parts in elevation, showing the switch in closed position.

Fig. 3 is a cross section taken on the line 3, 3, of Fig. 2.

Fig. 4 is an end elevation of the switch taken from the operator's end thereof.

Fig. 5 is a perspective view of the switch

point bearing member which is thrown or retracted by the mechanism of my invention.

The switch as shown in the drawings is adapted to be mounted on some sort of portable electric tool and may be used as a handle for such tool.

The casing of the switch comprises a long tubular portion 1, which is secured to a head 2 by means of a set screw 3. The head is divided into three parts, a socket 4 to receive the tube, a chamber 5 for the pawls and a chamber 6 for the switch points.

In the chamber 6 are the two switch terminals 7 and 8, which are to be connected to the service and motor. When connection is made between these two terminals, the wiring is so arranged that the current will be turned on in the motor that operates the tool, since one of the service wires is connected to the motor direct.

The switch closing member comprises a tube 9, slidably mounted in the wall between the chambers 5 and 6 of the head, on the end of which are set the contact pieces 11, 11, which are interconnected and close the circuit across the terminals 7 and 8, by a direct longitudinal movement. Due to this form of contact device, the electrical connection is made at all points at the same time, and not gradually as in the case of a knife blade switch where a pivoted member swings down in between two clips, or in a circular movement switch in which a contact member slides over the terminal button or plate.

The tubular contact member (Fig. 5) has a flanged end 12 at the rear, and lies in a larger tube 13, which slides in the outer tube 1. The tube 13 is formed thicker at the forward end 13^a so as to snugly journal the tubular contact member, and the flanged end of the said tubular member lies within the main portion of the tube 13. Around the tube 13 between it and the outer tube 1 is a strong spring 14, which presses against the inner end of the socket 4 of the head and against the shouldered end 15 of the tube 13.

When the tube 13 is moved forwardly as will be described the spring 14 will be compressed. As will be noted also, the tube 13 is held in place with the spring compressed until released by striking up a pawl, where-

upon the tube 13 will spring violently back with the thickened head thereof contacting with the flanged end of the tubular member and drawing it suddenly away from contact position.

Running through the tube 13 and the tubular member 9 is a central rod 16. At the rear end of this rod is a bifurcated head 17 which bears against the rear end of the tube 13. A collar 18 is mounted on this rod to form one terminal bearing point for a coiled spring 19. This spring bears on its other end against the flanged end 12 of the tubular contact bearing member.

Upon thrusting forward the rod 16, its head will move also the tube 13. It will also compress the spring 19, so long as the tubular member is held against movement. This forward movement of the rod will thus compress the two springs which work the switch, the spring 19 the forward mover and the spring 14 the rearward or opening mover. There are required two pawls, one to hold the tubular member against forward movement until the spring 19 is compressed and one to hold the tube 13 against rearward movement until the moment that it is desired to open the switch, and means for raising the pawls at the proper time.

The pawl 20 serves to hold the tubular member 9 in retracted position. It is mounted in the pawl chamber and spring-pressed toward engaging position by the spring 21. The tubular member has a slot 22 in which the pawl engages when retracted and in open position. The pawl 23 serves to retain the tube 13. It is located in the chamber 5 and is spring-pressed by the spring 24. The slot 25 in the tube 13 provides the engagement means for this pawl.

The rod 16 carries two studs 26 and 27. They both slide in slots 28, 28^a, in the tubular member provided for this purpose, and also have clearance slots 29, 29^a, in the tube 13. Upon forward movement of the rod, after the spring 19 has been duly compressed, the stud 26 strikes up the pawl 20 and permits the tubular member to spring forward into contact. The tube 13 will at such position of the rod already come into position to be locked by the pawl 23.

When the rod 16 is brought back, the stud 27 strikes up the pawl 23, so that the tube 13 snaps strongly back, drawing the tubular member with it, and out of contact position.

As can be seen, the parts of this mechanism now described are large and permit of the use of strong and heavy springs. The action can thus be very quick and positive.

It remains to describe the operating finger. It will be noted that the rod 16 has a bifurcated head 17. In this head is pivoted a link 30. Mounted in the end of the outer tube 1 is a hollow plug 31 that extends in-

wardly with a pair of arms 32. A bifurcated finger piece 33 is pivoted between the arms 32 by means of a pin 34, and between the parts of the finger piece is pivoted the link 30. This construction so operates that when the finger piece, which extends out through the tube 1 is thrust forward, this motion will move the rod 16 forward on a straight line, and vice versa when it is withdrawn. A spring 35 may be used to help the quick retractive movement of the rod 16 upon the release of the finger piece, but it has not been found to be absolutely necessary.

For operation with such electric tools as portable reamers or drills, the necessity of instantaneous opening of the switch upon striking a hard place, to avoid destroying the reaming or drilling tool, makes it better to have the finger piece free to move rearwardly when it is released, thereby requiring the operator to keep his hand over the said piece while using the device. In other tools, such as grinders or drilling machines, where the necessity of frequent release of the switch closer is not so necessary, a simple catch for the finger piece may be provided. This catch is shown in the drawings, but may be entirely omitted when desired.

The two arms 32 of the plug 31 in the end of the tube 1 are not made of the same thickness, so as to leave a space between the finger piece and one of the arms (Fig. 3). A pin 36 passes through aligned holes 37, 38, in the plug. On the pivot pin 34, in the space left by the slight offsetting of the piece 33, as noted at the beginning of this paragraph, is simply held a slotted plate 39, the slot of which is set over the pin 34. The end of this plate is formed with a hook 40 which lies in the path of the head of the pin 41 which is used to pivot the link 30 to the bifurcated finger piece. The plate is also connected to the pin 36 which enters through the plug, as noted.

When the finger piece is thrust forward to close the switch, the pivot pin therein rides under the hooked end of the plate, which plate will then hold the pin against moving back again in the same arc in which it came, because of a slight resiliency of the metal of the hook, and such play as is necessarily left in the plate 39. A slight inward push on the exposed end of the pin 36 will, however, move the hook slightly forward which will release the finger piece and permit the opening of the switch.

This latching mechanism can be removed, as is obvious, without changing the device in any other manner.

It is believed that the various mechanisms in the switch are now fully described, and their operation sufficiently noted. It is not desired that the claims that follow be given

a narrow construction because of my failure to point out alternative mechanical expedients which could be substituted for those described, without departing from the spirit of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a quick throw electrical switch, a sliding switch closing member, a spring bearing directly on said member, a member adapted to engage the switch closing member and draw it out of closing position, a spring bearing directly on said engaging member, pawls to retain the switch closing member and the engaging members therefor in position, and means for compressing the springs, and releasing the pawls after the springs are compressed, and an independent latch for controlling the opening movement of the closing member, for the purpose described.

2. In a quick throw electrical switch, an outer and an inner tube, a rod within the inner tube, a spring for the outer tube, a spring for the inner tube wound around the rod, means on the rod for moving the outer tube for compressing the first named spring and for compressing the spring for the inner tube, pawls to hold the outer and inner tubes, and means on the rod to trip the pawl for the inner tube on its forward movement, and the pawl for the outer tube on its rearward movement.

3. An electric switch comprising a casing having a tubular body and a head containing electrical terminals, an outer tube within the body, an inner tube carrying a contact within the head, a rod, pawls for retaining the outer tube and the circuit closing tube, means on the rod to trip the pawls, a spring for the outer tube, a spring for the inner tube, said rod adapted to move the outer tube for compressing the first named spring and to compress the last named spring against the circuit closing tube.

4. An electrical switch comprising a casing, an outer longitudinally sliding member in the casing, a spring around said member, and abutments for the spring to cause its compression upon the forward movement of said member, a pawl adapted to engage the said member after compression of the spring, an intermediate longitudinally sliding member within the outer member, switch closing contacts on the said member, an inner member longitudinally sliding within the said intermediate member, a spring

around the inner member adapted to bear on the intermediate member, a pawl for holding the intermediate member against movement during the compression of the said spring, and pawl tripping means on the inner member to trip the said pawls, one at the close of the forward movement thereof and one at the beginning of the rearward movement thereof, for the purpose described.

5. An electric switch comprising a tubular body portion, telescoping longitudinally moving members within said tubular body portion, means for holding each member against movement, an actuating member having means to release for movement the other members, one upon a forward movement thereof, and one upon a rearward movement thereof, a spring for each member, a pivoted finger piece within said body portion, said finger piece being pivotally connected to the said actuating means.

6. An electric switch comprising in part a body portion, three telescoping longitudinally moving members within said body portion, latches for two of the members, the third of said members adapted to release for movement the other two latched members, one upon a forward movement thereof, and one upon a rearward movement thereof, a slot in said body portion, a pivoted finger piece within said body portion and extending through said slot, said finger piece being pivotally connected to the said releasing member, and a latch inserted through the end of the body portion for locking the finger piece at the end of its forward movement.

7. An electric switch comprising in part a body portion, three telescoping longitudinally moving members within said body portion, latches for two of the members, the third of said members adapted to release for movement the other two latch members, one upon a forward movement thereof, and one upon a rearward movement thereof, and means for manually actuating the said third member.

8. An electric switch comprising in part a body portion, three telescoping longitudinally moving members within said body portion, latches for two of the members, the third of said members adapted to release for movement the other two latch members, one upon a forward movement thereof, and one upon a rearward movement thereof.

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