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Zimmer

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(54) **ELECTRICAL SWITCH DEVICE**

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(51) **Int. Cl.**

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H01R 27/02	(2006.01)
H01R 24/58	(2011.01)
F41G 11/00	(2006.01)
F41G 1/32	(2006.01)

(52) **U.S. Cl.**
CPC ***H01H 9/0235*** (2013.01); ***F41C 27/00*** (2013.01); *F41G 1/32* (2013.01); *F41G 11/003* (2013.01); *H01R 24/58* (2013.01); *H01R 27/02* (2013.01)

(58) **Field of Classification Search**
CPC F41G 1/35; H01H 9/0235; H01H 13/70
USPC 42/146
See application file for complete search history.

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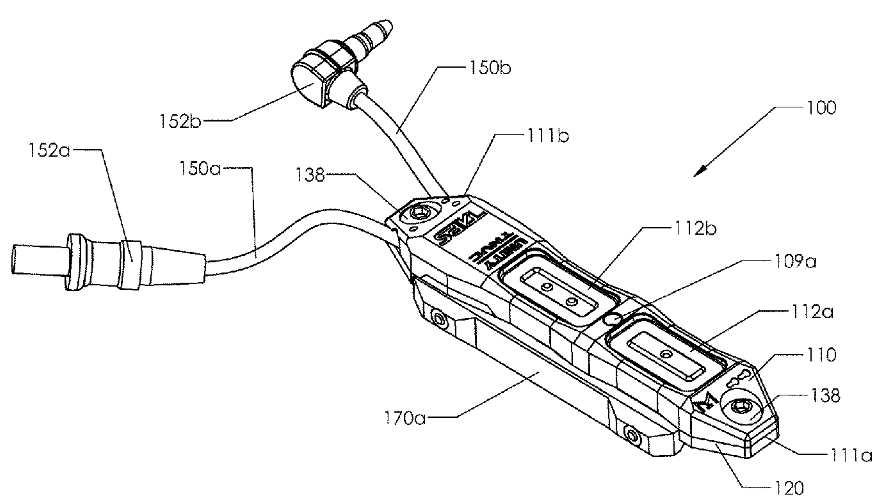
(57) **ABSTRACT**

Implementations of an electrical switch device are provided. In some implementations, the electrical switch device may be used to operate electrically powered firearm accessories (e.g., lasers and illumination tools). In some implementations, the electrical switch device may be conductively connected to a firearm accessory by a flexible cable having a connector thereon. In this way, the electrical switch device may be remotely positioned relative to the firearm accessory to which it is attached. In some implementations, the electrical switch device may be secured to a mounting interface (e.g., KeyMod or M-LOK® accessory mounting slots and/or a Picatinny rail) for firearm accessories. In some implementations, the electrical switch device may include user selectable programs that control the operation of connected firearm accessories.

17 Claims, 6 Drawing Sheets



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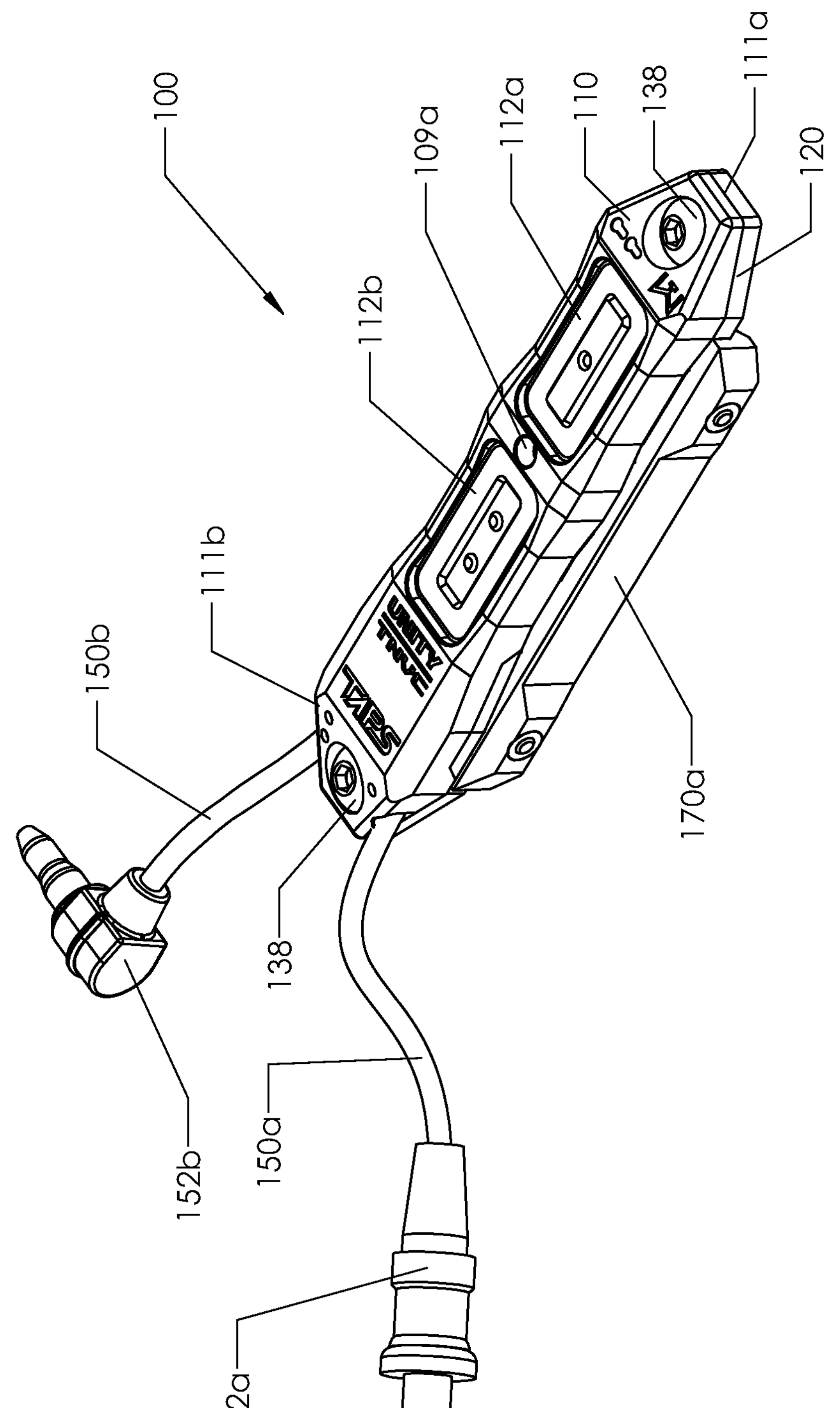

100
109a
112a
110
138
111a
120
112b
111b
150b
170a
138
152b
150a
152a

FIG. 1

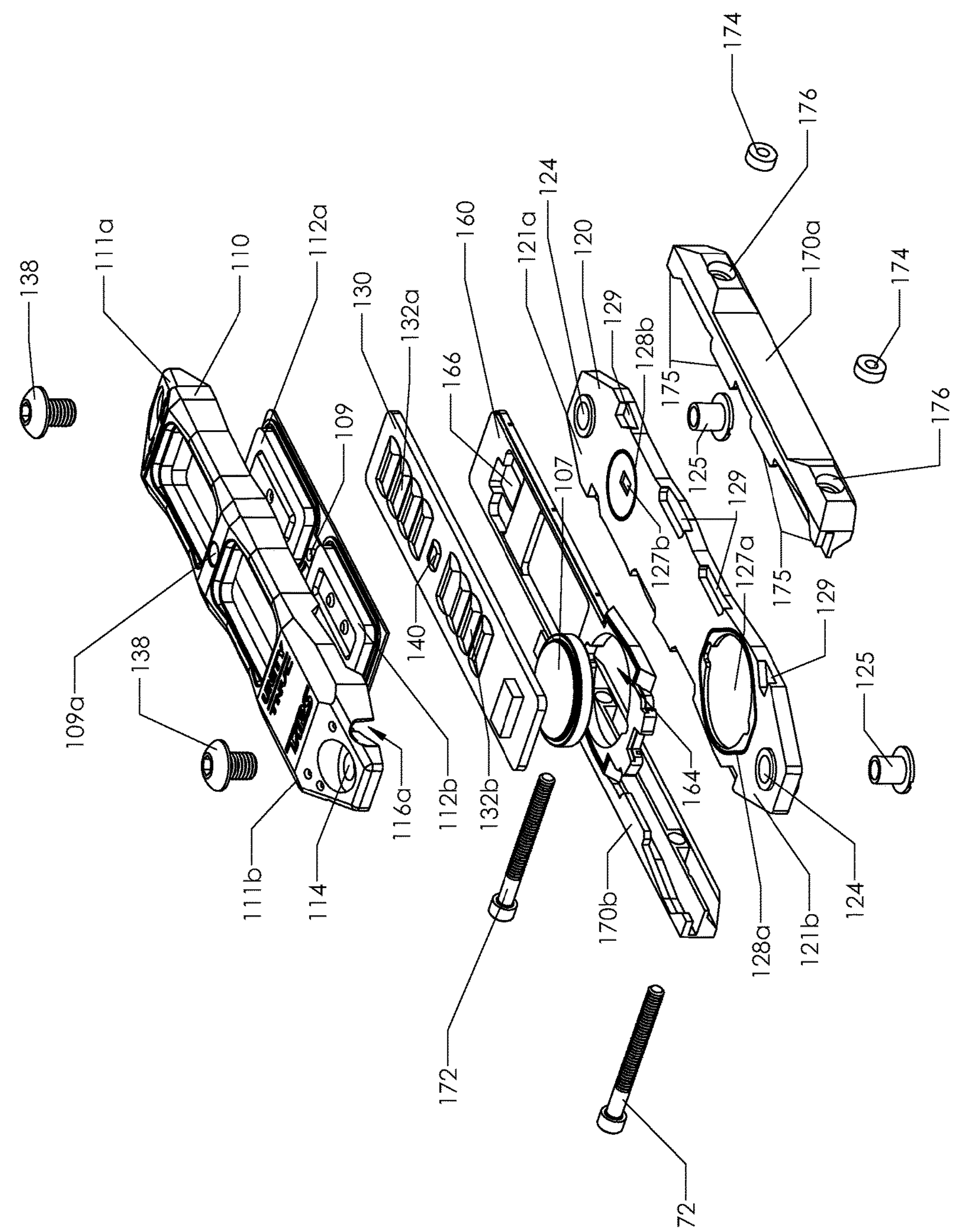
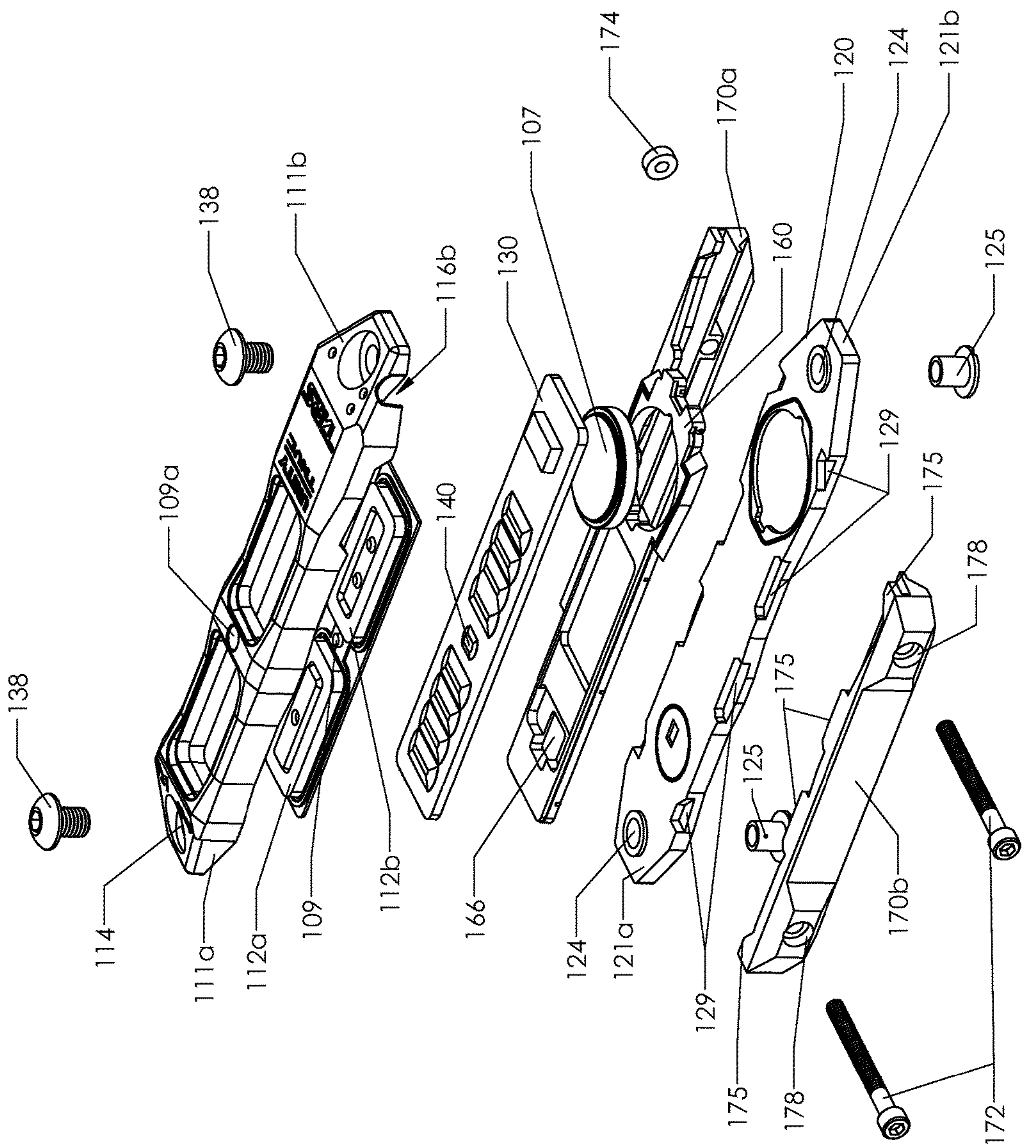

138
111a
110
112a
130
132a
160
166
121a
124
120
129
128b
174
176
170a
175
109
107
125
127b
129
127a
175
176
174
109a
138
140
129
125
116a
112b
132b
164
111b
114
170b
128a
121b
124
172
172

FIG. 2A



138
111b
116b
130
107
174
170a
160
120
124
121b
125
129
175
178
109a
140
138
114
111a
112a
109
112b
166
124
121a
129
125
175
170b
175
178
172

FIG. 2B

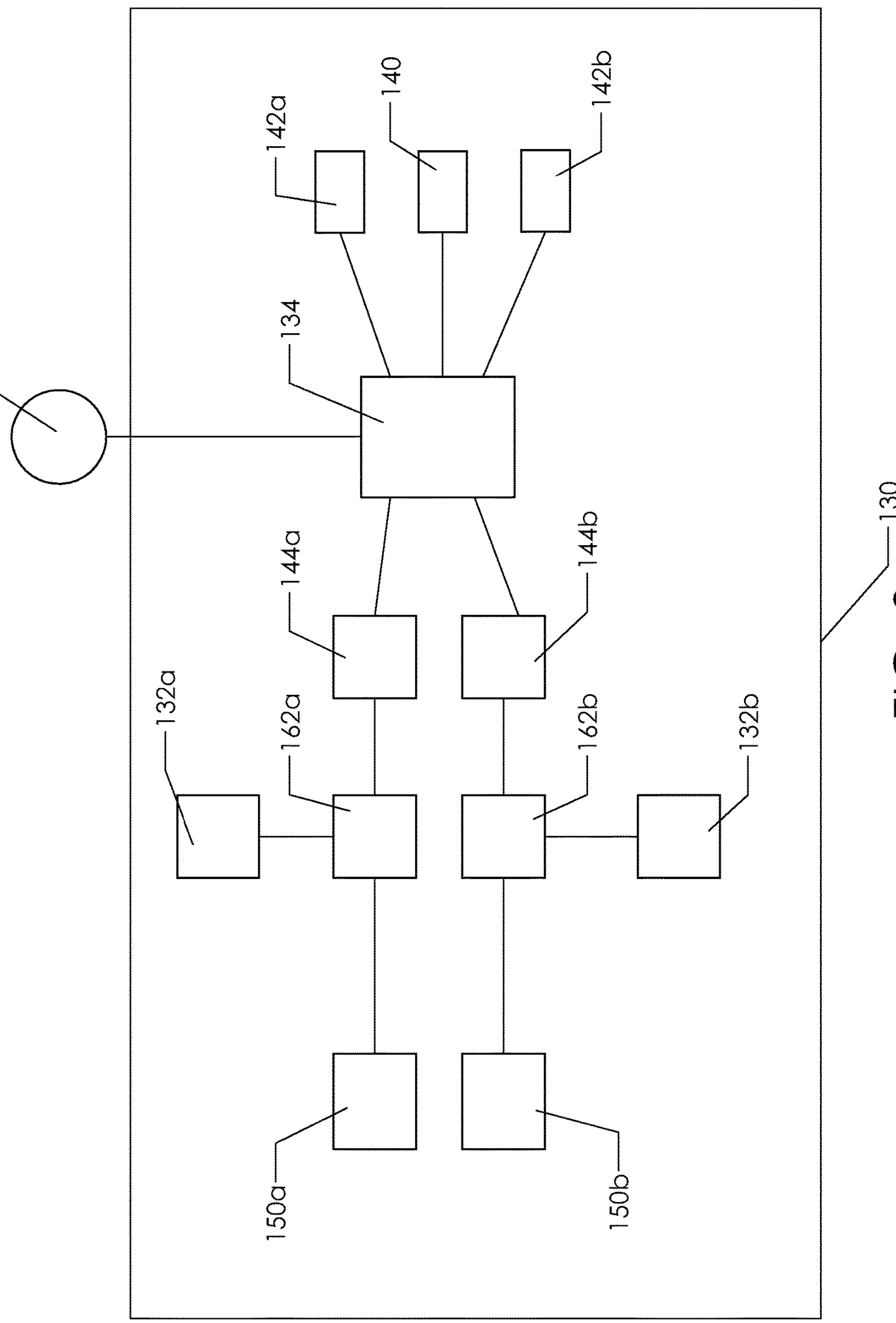

107
134
142a
140
142b
144a
144b
130
132a
162a
162b
132b
150a
150b

FIG. 3

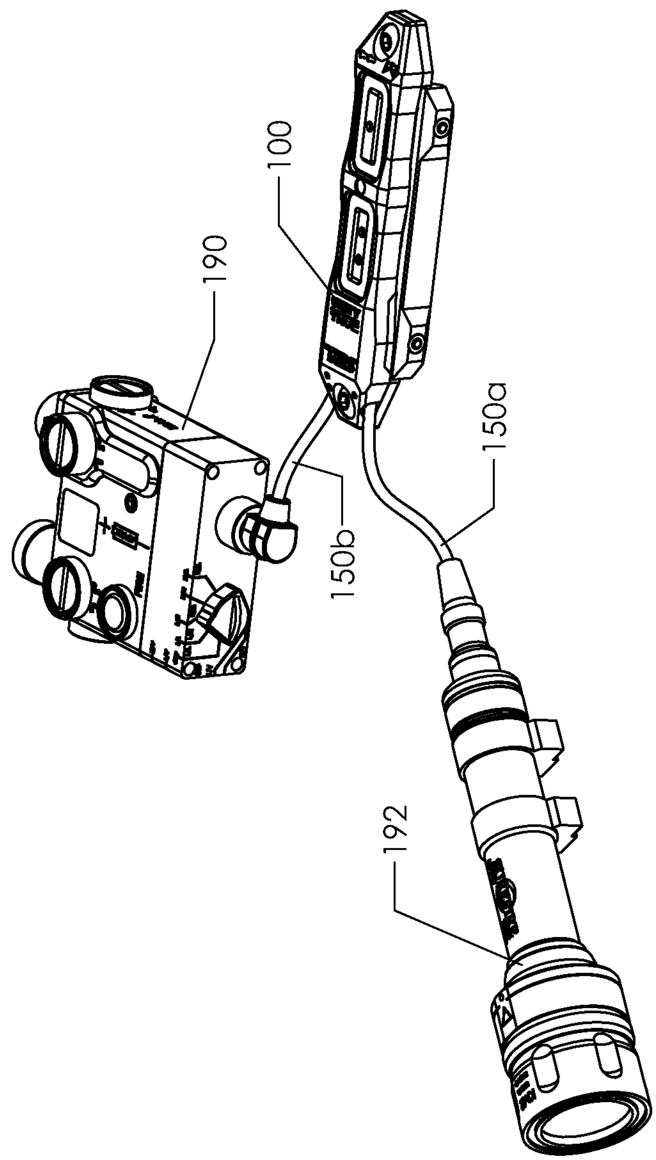


FIG. 4

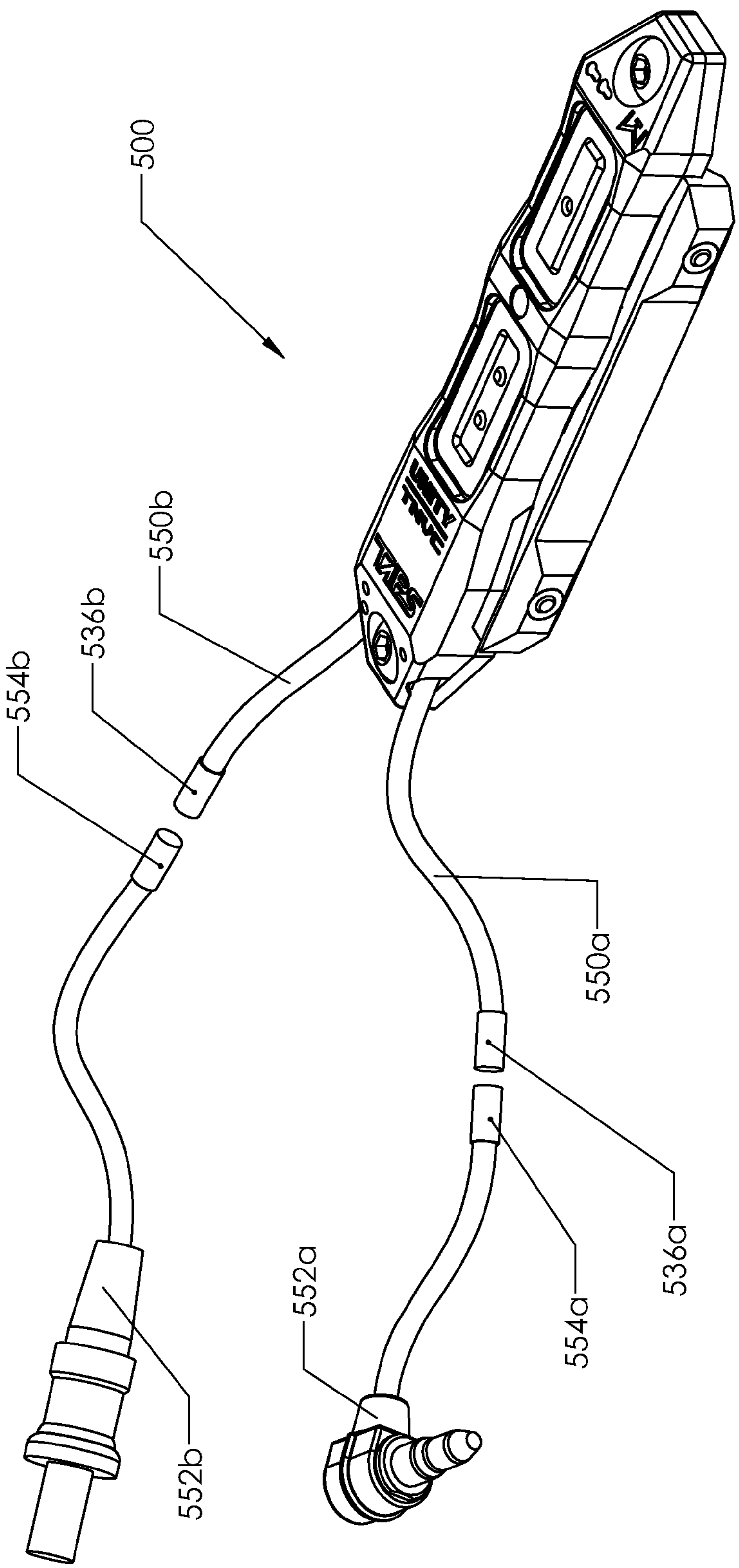


FIG. 5

ELECTRICAL SWITCH DEVICE

CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Patent Application Ser. No. 62/104,889, which was filed on Jan. 19, 2015, and is incorporated herein by reference in its entirety.

TECHNICAL FIELD

This disclosure relates to implementations of an electrical switch device for use with electrically powered firearm accessories.

BACKGROUND

Switch operated electrical accessories (e.g., lasers and illumination tools) have been adapted for being secured to firearms. Electrical accessories are frequently positioned on a firearm to be parallel with, and close to the barrel of the firearm. In general, a mount is used with the electrical accessory to releasably secure it to a mounting interface (e.g., a Picatinny rail) secured to the firearm. Accessory mounts and mounting interfaces are well known in the art pertaining to firearms.

A variety of switch apparatuses are available to operate firearm mounted electrical switch devices, including tail cap switches and plug-in remote switches with "constant on" and "momentary on" capabilities. User preference and tactical considerations often direct both the positioning and selection of a particular switch type.

SUMMARY OF THE INVENTION

Implementations of an electrical switch device are provided. In some implementations, the electrical switch device may be used to operate electrically powered firearm accessories (e.g., lasers and illumination tools). In some implementations, the electrical switch device may be conductively connected to a firearm accessory by a flexible cable having a connector thereon. In this way, the electrical switch device may be remotely positioned relative to the firearm accessory to which it is attached. In some implementations, the electrical switch device may be secured to a mounting interface (e.g., KeyMod or M-LOK® accessory mounting slots and/or a Picatinny rail) for firearm accessories. In some implementations, the electrical switch device may include user selectable programs that control the operation of connected firearm accessories.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates an example implementation of the electrical switch device according to the principles of the present disclosure.

FIGS. **2**A and **2**B illustrate exploded views of the electrical switch device shown in FIG. **1**.

FIG. **3** illustrates an example schematic view of the electronic circuitry of the electrical switch device according to the present disclosure.

FIG. **4** illustrates the electrical switch device shown in FIG. **1** connected to two firearm accessories.

FIG. **5** illustrates another example implementation of the electrical switch device according to the principles of the present disclosure.

DETAILED DESCRIPTION

FIGS. **1** and **2**A-**2**B illustrate an electrical switch device **100** according to the present disclosure. In some implementations, the electrical switch device **100** may be used to operate electrically powered firearm accessories (e.g., lasers and illumination tools). In some implementations, the electrical switch device **100** may be conductively connected to a firearm accessory by a flexible cable having a connector thereon. In this way, the electrical switch device **100** may be remotely positioned relative to the firearm accessory to which it is attached. In some implementations, the electrical switch device **100** may be secured to a mounting interface (e.g., KeyMod or M-LOK® accessory mounting slots and/or a Picatinny rail) for firearm accessories. In some implementations, the electrical switch device **100** may include user selectable programs that control the operation of connected firearm accessories.

As shown in FIG. **1**, in some implementations, the electrical switch device **100** may comprise a watertight housing **102** constructed to encase an electronic circuitry **105** (see, e.g., FIG. **3**). In some implementations, the electronic circuitry may include a first cable **150*a*** and a second cable **150*b*** (collectively cables **150**), a first activation switch **132*a*** and a second activation switch **132*b*** (collectively activation switches **132**), and a first selection switch **162*a*** and a second selection switch **162*b*** (collectively selection switches **162**).

As shown in FIGS. **2**A and **2**B, in some implementations, the housing **102** of the electrical switch device **100** may comprise a top body portion **110**, a middle body portion **160**, and a bottom body portion **120**.

As shown in FIGS. **2**A and **2**B, in some implementations, the top body portion **110** may have the general shape of a rectangle. In some implementations, the top body portion **110** may have any shape suitable for use as part of the housing **102** of the electrical switch device **100**.

As shown in FIGS. **2**A and **2**B, in some implementations, the top body portion **110** may have a first end **111*a*** and a second end **111*b***. In some implementations, the second end **111*b*** of the top body portion **110** may have a first opening **116*a*** and a second opening **116*b*** (collectively openings **116**) extending therethrough. In some implementations, the openings **116** may have a semi-circular shape configured to fit about a portion of a cable **150** (see, e.g., FIGS. **1** and **2**A-**2**B). In some implementations, each of the openings **116** may have any shape suitable for being secured about a portion of a cable **150** used to conductively connect the electrical switch device **100** to an electrically powered firearm accessory (see, e.g., FIG. **4**). In some implementations, there may be more than two or less than two openings **116** for cables **150** extending through the top body portion **110** of the housing **102**.

In some implementations, a gasket may be placed about the interior of each opening **116*a***, **116*b***. In this way, water may be prevented from entering the housing **102** through the openings **116** when the housing **102** is assembled. In some implementations, the gasket(s) may be manufactured from rubber. In some implementation, the gasket(s) may be manufactured from any suitable material.

As shown in FIGS. **1** and **2**A, in some implementations, the top body portion **110** includes a program switch cover **109**, a first switch cover **112*a***, and a second switch cover **112*b*** (collectively switch covers **112**).

As shown in FIG. **1**, in some implementations, the program switch cover **109** is accessible through an opening **109*a*** in the top body portion **110**. In some implementations, the program switch cover **109** is recessed within the opening

109*a*. In this way, the program switch **140** may not be inadvertently activated. In some implementations, the opening **109***a* used to access the program switch cover **109** is positioned to be over the program switch **140** when the housing **102** is assembled.

As shown in FIG. **1**, in some implementations, each switch cover **112***a*, **112***b* is accessible through two openings extending through a top side of the top body portion **110**. In some implementations, the openings used to access the first switch cover **112***a* and the second switch cover **112***b* are positioned to be over the first activation switch **132***a* and the second activation switch **132***b*, respectively, when the housing **102** is assembled.

As shown in FIG. **2**A, in some implementations, each switch cover **112** may have the general shape of a rectangle. In some implementations, each switch cover **112** may be any shape suitable for use with the housing **102** of the electrical switch device **100**. In some implementations, the switch covers **112** may be molded into the top body portion **110** of the housing **102**.

In some implementations, the program switch cover **109**, the first switch cover **112***a*, and the second switch cover **112***b* may be configured to serve as gaskets and thereby prevent water from entering the housing **102** through their respective openings. In some implementations, the program switch cover **109** and the switch covers **112** may be manufactured from a rubber material. In some implementations, the program switch cover **109** and the switch covers **112** may be manufactured from a flexible synthetic material. In some implementations, the program switch cover **109** and the switch covers **112** may be manufactured from any suitable material.

As shown in FIGS. **2**A and **2**B, in some implementations, there may be a bore **114** extending through the first end **111***a* and the second end **111***b* of the top body portion **110**. In some implementations, each bore **114** may be configured to receive a threaded fastener **138** therein (see, e.g., FIG. **1**). In this way, the top body portion **110** may be secured to the bottom body portion **120** of the housing **102** (discussed in further detail below).

As shown in FIG. **2**A, in some implementations, the middle body portion **160** is configured to fit between the top body portion **110** and the bottom body portion **120**. In some implementations, the middle body portion **160** may be used to secure the PCB **130** to the top body portion **110** of the electrical switch device **100**. In some implementations, the middle body portion **160** may be configured to lock to the top body portion **110**. In some implementations, the middle body portion **160** includes a bore **164** therethrough configured to receive the power source **107** and an opening(s) **166**.

As shown in FIG. **2**A, in some implementations, the opening **166** extends through the middle body portion **160**. In some implementations, the first selection switch **162***a* and the second selection switch **162***b* may extend from a bottom side of the PCB **130** through the opening **166** in the middle body portion **160**. In this way, selection switches **162** may be accessed and toggled when a user removes the bottom body portion **120** from the top body portion **110** of the housing **102**.

As shown in FIG. **2**A, in some implementations, the bottom body portion **120** may have the general shape of rectangle. In some implementations, the bottom body portion **120** may have any shape suitable for use as part of the housing **102** of the electrical switch device **100**.

As shown in FIG. **2**A, in some implementations, there may be a first recess **127***a* in the interior side of the bottom body portion **120** configured to receive a portion of the power source **107** (e.g., one or more batteries) therein. In some implementations, an o-ring **128***a* may be nested within the bottom body portion **120** and positioned to form a perimeter around the first recess **127***a* (see, e.g., FIG. **2**A). In this way, water and other liquids may be prevented from seeping around the power source **107** and into the housing **102**.

As shown in FIG. **2**A, in some implementations, there may be a second recess **127***b* in the interior side of the bottom body portion **120** configured to receive therein a portion of the selection switches **162** extending from the PCB **130** through the middle body portion **160**. In some implementations, an o-ring **128***b* may be nested within the bottom body portion **120** and positioned to form a perimeter around the second recess **127***b* (see, e.g., FIG. **2**A). In this way, water and other liquids may be prevented from seeping around the selection switches **162** and into the housing **102**.

As shown in FIG. **2**A, in some implementations, there may be a bore **124** extending through the first end **121***a* and a second end **121***b* of the bottom body portion **120**. In some implementations, each bore **124** may be configured to receive therein a lug **125** or similar thread insert. In some implementations, each lug **125** may be configured to threadedly receive a portion of a threaded fastener **138** therein.

As shown in FIG. **2**A, in some implementations, the PCB **130** may have the general shape of a rectangle. In some implementations, the PCB **130** may be any shape suitable for being positioned within the housing **102** of the electrical switch device **100**. In some implementations, the PCB **130** may form a portion of the electronic circuitry **105** (see, e.g., FIG. **3**). In some implementations, the PCB **130** may include thereon a logic board **134**, a first solid state rely **144***a*, a second solid state relay **144***b*, the first selection switch **162***a*, the second selection switch **162***b*, the first activation switch **132***a*, the second activation switch **132***b*, the first cable **150***a*, the second cable **150***b*, a first program activation switch **142***a* and a second program activation switch **142***b* (collectively program activation switches **142**), and the program switch **140** (see, e.g., FIG. **3**).

In some implementations, each cable **150** may include a connector **152***a*, **152***b* thereon configured to connect with an electrically powered firearm accessory (see, e.g., FIG. **4**, elements **190** (a laser) and **192** (an illumination tool)).

In some implementations, the following steps may be taken to assemble the housing **102** of an electrical switch device **100** constructed in accordance with the present disclosure. Initially, the switch covers **112** and the program switch cover **109** may be positioned in the top body portion **110** as described above. Then, the PCB **130** is oriented and positioned so that the first cable **150***a* and the second cable **150***b* extend through the first opening **116***a* and the second opening **116***b*, respectively, of the top body portion **110** (see, e.g., FIG. **1**). Next, the middle body portion **160** may be oriented so that the end with the bore **166** therethrough is positioned adjacent the second end **111***b* of the top body portion **110** (see, e.g., FIG. **2**A). Then, the middle body portion **160** is secured to the underside of the top body portion **110**. In this way, the PCB **130** may be held in position against the underside of the top body portion **110**. Then, the bottom body portion **120** is positioned so that the bore **124** extending through the first end **121***a* and the second end **121** thereof is in alignment with the bore **114** extending through the first end **111***a* and the second end **111***b*, respectively, of the top body portion **110**. Next, a fastener **138** in inserted through each bore **114** of the top body portion and threadedly secured to the lug **125** positioned in each bore **124** of the bottom body portion **120** (see, e.g., FIG. **1**)

To disassemble the housing **102** of the electrical switch device **100**, the above steps are performed in reverse.

To remove only the bottom body portion **120** from the top body portion **110**, the fasteners **138** need only be removed from the lugs **125**.

In some implementations, the lugs **125** described above may be replaced with lugs configured to interface with KeyMod and/or M-LOK® accessory mounting slots. In this way, the housing **102** of the electrical switch device **100** may be directly mounted to a mounting interface having KeyMod and/or M-LOK® accessory mounting slots.

As shown in FIG. **1**, in some implementations, the housing **102** of the electrical switch device **100** may be configured to secure to a Picatinny rail (also known as a MIL-STD 1913 rail). In some implementations, the housing **102** may be secured to a Picatinny rail through the use of a clamp **170** comprising a first longitudinal flange **170***a*, a second longitudinal flange **170***b*, two threaded fasteners **172**, and two thread inserts **174** (see, e.g., FIG. **2**B).

As shown in FIGS. **1** and **2**A, in some implementations, each longitudinal flange **170***a*, **170***b* may be configured to interface with the bottom body portion **120** of the housing **102** and a Picatinny rail. In some implementations, a thread insert **174** may be secured within each bore **176** extending through the first longitudinal flange **170***a* (see, e.g., FIG. **2**A). In some implementations, the second longitudinal flange **170***b* may include two bores **178** extending therethrough. In some implementations, recesses **129** in the first side and the second side of the bottom body portion **120** are formed to receive the protrusions **175** extending from the first longitudinal flange **170***a* and the second longitudinal flange **170***b*, respectively (see, e.g., FIGS. **2**A and **2**B). In this way, the longitudinal flanges **170***a*, **170***b* may prevent the forward and rearward movement of the housing **102** when the clamp **170** has been used to secure it to a Picatinny rail.

To use the clamp **170** to secure the housing **102** to a Picatinny rail, in some implementations, the housing **102** may be initially placed against the Picatinny rail.

Then, the first longitudinal flange **170***a* may be oriented so that the protrusions **175** thereon will be received within the recesses **129** on the first side of the bottom body portion **120** (see, e.g., FIG. **2**A). Next, the first longitudinal flange **170***a* is placed against the first side of the bottom body portion **120**.

Then, the second longitudinal flange **170***b* may be oriented so that the protrusions **175** thereon will be received within the recesses **129** on the second side of the bottom body portion **120** (see, e.g., FIG. **2**B). Next, the second longitudinal flange **170***a* is placed against the second side of the bottom body portion **120**.

Then, a fastener may be inserted through each bore **178** in the second longitudinal flange **170***b*, through the space between the ribs (not shown but well known in the art) of the Picatinny rail, and threadedly secured to the thread inserts **174** of the first longitudinal flange **170***a* (see, e.g., FIG. **1**).

In some implementations, the clamp **170** and/or the bottom body portion **120** may be configured to secure to any mounting interface for firearm accessories currently known or developed in the future.

As shown in FIG. **3**, in some implementations, the electronic circuitry **105** may comprise a power source **107**, such as one or more batteries, the logic board **134**, the first solid state rely **144***a*, the second solid state relay **144***b*, the first selection switch **162***a*, the second selection switch **162***b*, the first activation switch **132***a*, the second activation switch **132***b*, the first cable **150***a*, the second cable **150***b*, the program switch **140**, the first program activation switch **142***a*, and the second program activation switch **142***b*. In some implementations, the power source **107** is conductively connected to the PCB **130**. Although not shown in the drawings, it will be understood that suitable wiring connects the electronic components of the electronic circuitry **105** in the housing **102**.

As shown in FIG. **3**, in some implementations, the first selection switch **162***a* and the second selection switch **162***b* may be conductively connected to the first activation switch **132***a* and the second activation switch **132***b*, respectively. In some implementations, the first selection switch **162***a* may be used to conductively connect the first activation switch **132***a* to the first cable **150***a* and/or the second cable **150***b*. In some implementations, the second selection switch **162***b* may be used to conductively connect the second activation switch **132***b* to the first cable **150***a* and/or the second cable **150***b*. If the electronic circuitry **105** loses power, through the use of the selection switches **162**, the user may select which cable(s) **150** each activation switch **132** is conductively connected with. In some implementations, the selection switches **162** may be rotary and/or dip switches.

In some implementations, the activation switches **132** may be used for selectively closing a circuit thereby causing an attached electrically powered firearm accessory (e.g., a laser **190** or an illumination tool **192**) to be energized by its internal power source. In some implementations, the first activation switch **132***a* and/or the second activation switch **132***b* may be constructed to operate as a pressure actuable "MOMENTARY ON" switch. In some implementations, the first activation switch **132***a* and/or the second activation switch **132***b* may be constructed to operate as a pushbutton actuable "CONSTANT ON/OFF" and "MOMENTARY ON" switch. In some implementations, the first activation switch **132***a* and/or the second activation switch **132***b* may be configured to provide tactile feedback during use. In some implementations, the activation switches **132** may be utilized even when the electronic circuitry **105** is not electrically powered (i.e. the power source **107** is dead). In some implementations, each activation switch **132** may be a dome switch.

In some implementations, the first activation switch **132***a* is co-mounted on the PCB **130** with the first program activation switch **142***a* and the second activation switch **132***b* is co-mounted on the PCB **130** with the second program activation switch **142***b*. In some implementations, the co-mounted first activation switch **132***a* and first program activation switch **142***a* are positioned on the PCB **130** so that both are located under the first switch cover **112***a* when the housing **102** is assembled. In this way, when the user depresses the first switch cover **112***a* both switches **132***a*, **142***a* are engaged. In some implementations, the co-mounted second activation switch **132***b* and second program activation switch **142***b* are positioned on the PCB **130** so that both are located under the second switch cover **112***b* when the housing **102** is assembled. In this way, when the user depresses the second switch cover **112***b* both switches **132***b*, **142***b* are engaged.

As shown in FIG. **3**, in some implementations, the first program activation switch **142***a* and the second program activation switch **162***b* may be operationally connected to the logic board **134**. In some implementations, the logic board **134** may operationally connect the first program activation switch **142***a* with the first cable **150***b* and/or the second cable **150***b*. In some implementations, the logic board **134** operationally connects the second program activation switch **142***b* with the first cable **150***b* and/or the second cable **150***b*. In some implementations, each program activation switch **142***a*, **142***b* may be individually associated with one or more programs stored in the memory of the logic board **134**. In this way, when a program activation switch **142***a*, **142***b* is pressed the program associated therewith will set the mode of operation for the one or more firearm accessories operationally connected thereto.

In some implementations, one or more programs may be stored in the memory of the logic board **134**. In some implementations, one or more programs may be created by the user and stored in the memory of the logic board **134**. In some implementations, a program may be used to set the mode of operation (e.g., momentary on, constant on, strobe activation, or a combination thereof) for the electrically powered firearm accessories conductively connected to the electrical switch device **100** via the cables **150**. In some implementations, through the use of a program, how a program activation switch **142***a*, **142***b* is pressed (e.g., length of time and/or number of times) may dictate the mode of operation for any conductively connected electrically powered firearm accessories operationally connected thereto. In some implementations, a program may be used to place all or a portion (e.g., the logic board **134**) of the electronic circuitry **105** of the electrical switch device **100** into sleep mode (or auto shutdown mode) after a preset period of time has lapsed (e.g., one hour, five minutes, 10 minutes, etc . . .). In this way, the life of the power source **107** may be preserved. In some implementations, the program switch **140** may be used to initiate the creation of a program and/or the selection of a program stored in the memory of the logic board **134** (discussed in greater detail below). One of ordinary skill in the art having the benefit of the present disclosure would know how to construct a logic board **134** for use with the electrical switch device **100**.

Additional example programs stored in the memory of the logic board **134** and the mode(s) of operation provided thereby are as follows:

In some implementations, pressing one of the two program activation switches **142** may momentarily energize the one or more operationally connected electrically powered firearm accessories. In this implementation, once pressure is released from the program activation switch **142** the one or more firearm accessories are turned off.

In some implementations, pressing and releasing one of the two program activation switches **142** may continuously energize (constant on) the one or more operationally connected electrically powered firearm accessories. In this implementation, the one or more firearm accessories remain energized until the program activation switch **142** is pressed and released a second time.

In some implementations, holding a program activation switch **142** down momentarily energizes the operationally connected electrically powered firearm accessories. In this implementation, pressing and releasing (i.e., tapping) the program activation switch **142** twice in a row may continuously energize the one or more conductively connected electrically powered firearm accessories.

In some implementations, a program may operationally connect the first program activation switch **142***a* with both the first cable **150***a* and the second cable **150***b*. In this way, firearm accessories connected to the electrical switch device **100** via the cables **150***a*, **150***b* will simultaneously activate when the first program activation switch **142***a* is actuated.

In some implementations, a program can be used to place the second program activation switch **142***b* into circuit with both the first cable **150***a* and the second cable **150***b*. In this way, firearm accessories connected to the electrical switch device **100** via the cables **150***a*, **150***b* will simultaneously activate when the second program activation switch **142***b* is actuated.

The above modes of operation provided by the programs stored in the memory of the logic board **134** are for example only and are not intended to limit the scope of the invention thereto.

The following programming routine is provided as an example and should not be construed as a limitation on the scope of the present disclosure. The example programming routine may be used to create and store a program in the non-volatile memory of the logic board **134** and thereby associate one or more modes of operation with a program activation switch **142***a*, **142***b* and/or the electrical circuit **105** as a whole.

Step 1: Press program button **140**. Both firearm accessories attached to the electrical switch device **100** flash three times simultaneously thereby indicating that the programming routine mode has been initiated.

The electronic circuitry **105** will reset to factory condition if the program button **140** is depressed for more than 10 seconds. When the reset is complete, both attached firearm accessories will flash five times.

The program selection mode ends if the program button **140** is depressed and no further action is taken within 60 seconds. Both attached firearm accessories will flash once, one after the other, thereby indicating that no program has been created or changed.

Step 2: Select Slave Mode (i.e. placing a program activation switch **142***a*, **142***b* into circuit with both cables **150**). The attached firearm accessories will flash indicating the selection made (e.g., one flash "not slaved", two flashes "slaved").

Single press the first program activation switch **142***a*=Not Slaved.

Single press the second program activation switch **142***b*=Slaved.

Step 3: Select which program activation switch **142** is being programmed. Both firearm accessories will flash thereby indicating the selection made (e.g., one flash for the first program activation switch **142***a* and two flashes for the second program activation switch **142***b*).

Single press the first program activation switch **142***a*=first program activation switch **142***a* is being programmed.

Single press the second program activation switch **142***b*=second program activation switch **142***b* is being programmed.

Step 4: Select the mode of operation for the switch **142***a*, **142***b* selected during the previous step. Both firearm accessories flash the mode of operation selected (e.g., one flash=Momentary On, two flashes=Constant On, three flashes=double tap the switch for Constant On, and four flashes=hold switch down for Momentary On).

Single press first program activation switch **142***a*=Momentary On.

Double press first program activation switch **142***a*=Constant On.

Single press second program activation switch **142***b*=Double tap the switch for Constant On.

Double press second program activation switch **142***b*=Hold switch down for Momentary On.

Step 5: Select Auto Shutdown Mode delay for the electronic circuitry **105**. Both firearm accessories flash the selection (one flash=one hour, two flashes=5 min, three flashes=10 min).

Single press first program activation switch **142***a*=one Hour.

Single press second program activation switch **142***b*=5 Min.

Double press first program activation switch **142***a*=10 Min.

In some implementations, the logic board **134** may be preset to Auto Shutdown the electronic circuitry **105** after one hour.

Step 6: The Program is now stored in the non-volatile memory of the logic board **134** thereby ending the programming routine. Upon ending the programming routine the attached firearm accessories (see, e.g., FIG. **4**, elements **190** and **192**) will both flash five times to indicate that program creation was a success.

In some implementations, the top body portion **110**, the middle body portion **160**, and/or the bottom body portion **120**, may manufactured from a polymer. In some implementations, the top body portion **110**, the middle body portion **160**, and/or the bottom body portion **120** may manufactured from an aluminum alloy. In some implementations, top body portion **110**, the middle body portion **160**, and/or the bottom body portion **120** may be manufactured from any suitable material.

FIG. **5** illustrates another example electrical switch device **500**. The electrical switch device **500** is similar to the electrical switch device **100** discussed above but includes a first cable **550***a* having a detachable connector **552***a* thereon and a second cable **550** having a detachable connector **552***b* thereon. In this way, by changing the connector **552** attached to a cable **550** the user may select the electrically powered firearm accessory each cable **550** is configured to connect with.

As shown in FIG. **5**, in some implementations, there may be a first jack **536***a* and a second jack **536***b* on the end of the first cable **550***a* and the second cable **550***b*, respectively. In some implementations, there may be a first plug **554***a* and a second plug **554***b* on one end of the first connector **552***a* and the second connector **552***b*, respectively. In some implementations, the jack **536** on each cable **550** is configured to receive therein the plug **554** of each connector **552**. Selecting the appropriate jack **536** and plug combinations **554** for use with the electrical switch device **500** would be known to one of ordinary skill in the art.

Reference throughout this specification to "an embodiment" or "implementation" or words of similar import means that a particular described feature, structure, or characteristic is included in at least one embodiment of the present invention. Thus, the phrase "in some implementations" or a phrase of similar import in various places throughout this specification does not necessarily refer to the same embodiment.

Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings.

The described features, structures, or characteristics may be combined in any suitable manner in one or more embodiments. In the above description, numerous specific details are provided for a thorough understanding of embodiments of the invention. One skilled in the relevant art will recognize, however, that embodiments of the invention can be practiced without one or more of the specific details, or with other methods, components, materials, etc. In other instances, well-known structures, materials, or operations may not be shown or described in detail.

While operations are depicted in the drawings in a particular order, this should not be understood as requiring that such operations be performed in the particular order shown, or in sequential order, or that all illustrated operations be performed, to achieve desirable results.

The invention claimed is:

1. A switch device for use with electrically powered firearm accessories, the switch device comprising:

a housing having the shape of an elongated rectangle, the housing is configured to engage a mounting interface for firearm accessories and includes a first flexible switch cover and a second flexible switch cover that are in-line, the housing encases an electronic circuit, the electronic circuit comprising a first selection switch and a second selection switch, a first activation switch and a second activation switch that are in-line, and a first cable and a second cable;

wherein the first flexible switch cover is positioned over the first activation switch of the electronic circuit and the second flexible switch cover is positioned over the second activation switch of the electronic circuit;

wherein both the first cable and the second cable extend from a first end of the housing and include a connector thereon configured to connect with an electrically powered firearm accessory; and

wherein the first selection switch and the second selection switch are conductively connected to the first activation switch and the second activation switch, respectively, the first selection switch is configured to selectively place the first activation switch into circuit with the first cable or the second cable, and the second selection switch is configured to selectively place the second activation switch into circuit with the first cable or the second cable.

2. The switch device of claim **1**, wherein the first selection switch is configured to selectively place the first activation switch into circuit with both the first cable and the second cable, and the second selection switch is configured to selectively place the second activation switch into circuit with both the first cable and the second cable.

3. The switch device of claim **2**, wherein the first activation switch and the second activation switch are each configured to provide MOMENTARY ON operation of a conductively connected electrically powered firearm accessory.

4. The switch device of claim **2**, wherein the first activation switch and the second activation switch are configured to provide MOMENTARY ON operation and CONSTANT ON or OFF operation of a conductively connected electrically powered firearm accessory.

5. The switch device of claim **1**, the electronic circuit further comprises a power source, a logic board, a first program activation switch and a second program activation switch; the first program activation switch is co-mounted with the first activation switch, the second program activation switch is co-mounted with the second activation switch; wherein the first program activation switch and the second program activation switch are operationally connected to the logic board, the logic board is configured to selectively place the first program activation switch into circuit with the first cable or the second cable, the logic board is also configured to selectively place the second program activation switch into circuit with the first cable or the second cable.

6. The switch device of claim **5**, wherein the logic board is configured to selectively place the first program activation switch into circuit with both the first cable and the second cable, the logic board is also configured to selectively place the second program activation switch into circuit with both the first cable and the second cable.

7. The switch device of claim **6**, wherein the first program activation switch in conjunction with the logic board are configured to provide MOMENTARY ON operation of a conductively connected electrically powered firearm accessory, the second program activation switch in conjunction with the logic board are configured to provide MOMENTARY ON operation of a conductively connected electrically powered firearm accessory.

8. The switch device of claim **6**, wherein the first program activation switch in conjunction with the logic board are configured to provide MOMENTARY ON operation and CONSTANT ON or OFF operation of a conductively connected electrically powered firearm accessory; the second program activation switch in conjunction with the logic board are configured to provide MOMENTARY ON operation and CONSTANT ON or OFF operation of a conductively connected electrically powered firearm accessory.

9. The switch device of claim **6**, wherein the logic board is configured to enter sleep mode due to inactivity after a preset amount of time has lapsed.

10. The switch device of claim **6**, wherein the electronic circuitry further comprises a program switch; the logic board includes a non-volatile memory for storing one or more programs created during a programming routine, the programming routine is initiated by actuating the program button and is used to create one or more programs that set the mode of operation for any conductively connected electrically powered firearm accessories; the logic board is configured to associate at least a first program with the first program activation switch and a second program with the second program activation switch.

11. The switch device of claim **1**, wherein the connector on the first cable is removably secured thereto and the connector on the second cable is removably secured thereto.

12. The switch device of claim **6**, wherein the connector on the first cable is removably secured thereto and the connector on the second cable is removably secured thereto.

13. The switch device of claim **1**, wherein the housing further comprises a top body portion and a bottom body portion, the top body portion is configured to be secured to the bottom body portion of the housing, and the bottom body portion is positioned directly adjacent to a mounting interface for firearm accessories when the housing is engaged therewith; the top body portion includes a first opening and a second opening that extend therethrough, the first flexible switch cover and the second flexible switch cover are accessible through the first opening and the second opening, respectively.

14. The switch device of claim **13**, wherein the first cable and the second cable extend through a first opening and a second opening, respectively, in a first end of the top body portion of the housing.

15. The switch device of claim **13**, wherein the first flexible switch cover and the second flexible switch cover of the housing are configured to serve as gaskets and thereby prevent water from entering the housing through their respective openings.

16. The switch device of claim **11**, wherein the first cable and the second cable each include a jack on an end thereof, and each connector includes a plug on an end thereof; wherein the jack on the end of the first cable and the second cable is configured to interface with the plug on the end of each connector.

17. The switch device of claim **12**, wherein the first cable and the second cable each include a jack on an end thereof; and each connector includes a plug on an end thereof; wherein the jack on the end of the first cable and the second cable is configured to interface with the plug on the end of each connector.

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