United States Patent

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Continuation-in-part of application Ser. No. 599,904, Dec. 7, 1966, now Patent No. 3,496,319, dated Feb. 17, 1970.

[54] ELECTRIC SWITCH WITH RELEASABLE SCREW-THREADED SPRING CHARGING MEANS

11 Claims, 12 Drawing Figs.

[52] **U.S. Cl.** ..... **200/153 SC,** 74/89.151, 185/39
[51] **Int. Cl.** **H01h 3/30,** H01h 21/40, H01h 3/40
[50] **Field of Search** 200/153.23; 337/8, 7; 335/171, 173, 23; 185/37, 39; 74/59, 89.15, 127, 509

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ABSTRACT: A normally manually operable electric switch is provided with stored energy mechanism which can be remotely controlled to open the switch without interfering with the direct manual operation to open or close the switch. The stored energy mechanism consists of a threaded rod portion and releasable screw-threaded means engaging said rod portion and allowing a spring to be compressed; upon release of the releasable screw-threaded means, the spring discharges. The stored energy mechanism is manually operable to render it potentially operable to open the switch automatically by remote control and provision is made to render said mechanism inoperable when said remote control is not desired.

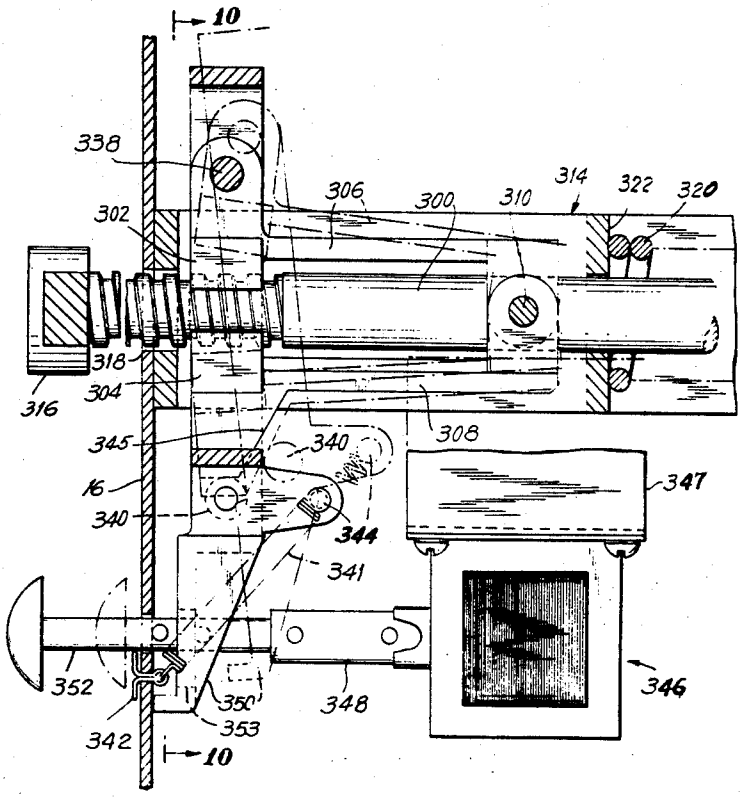
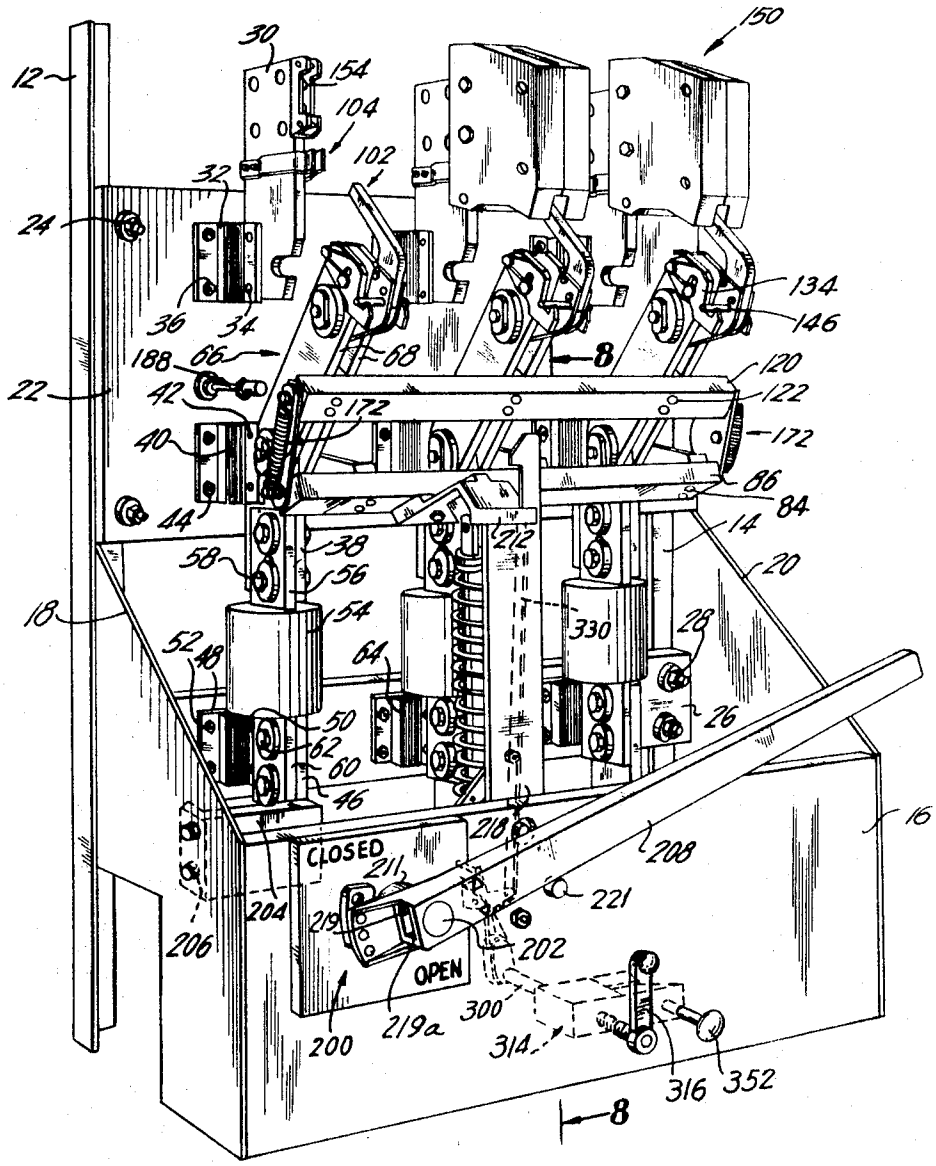


FIG. 1



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FIG. 2

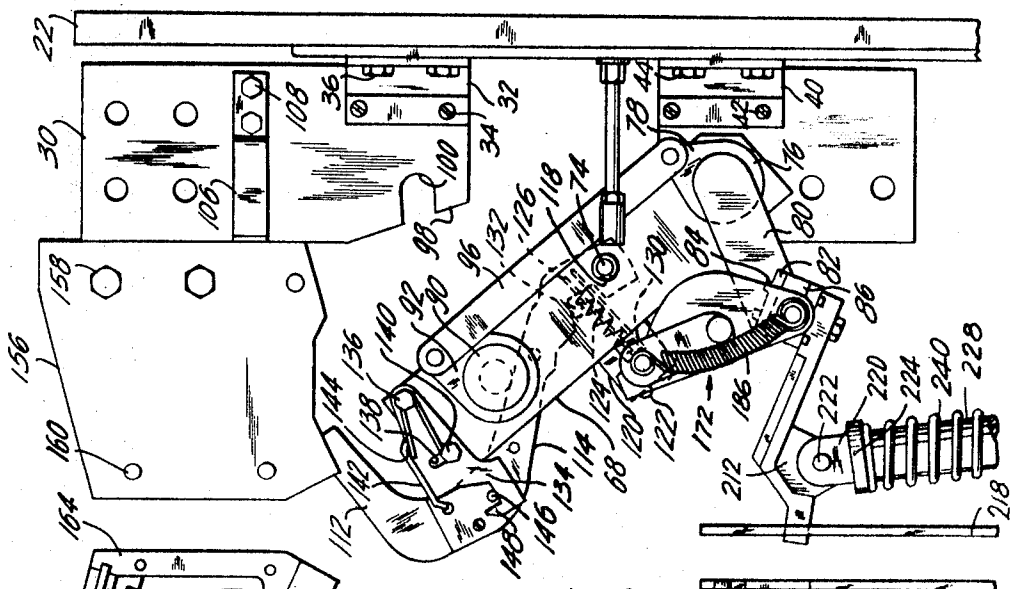


FIG. 4

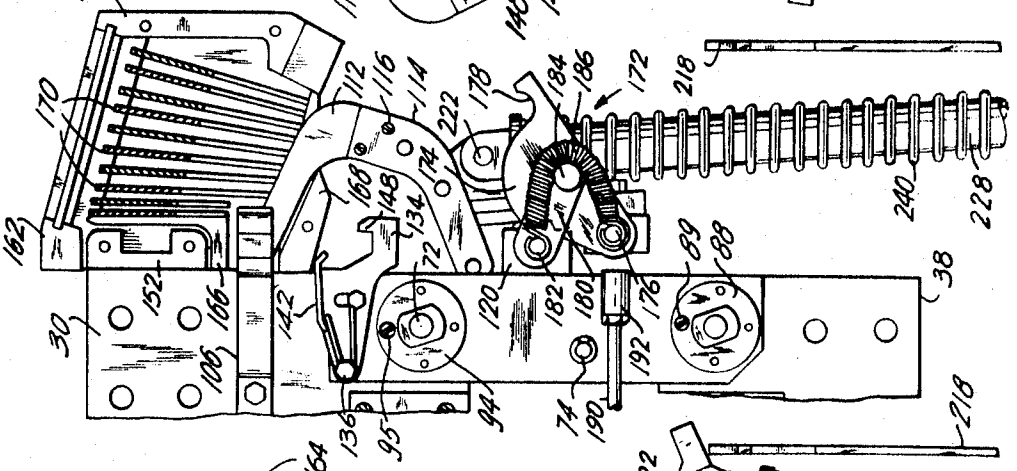
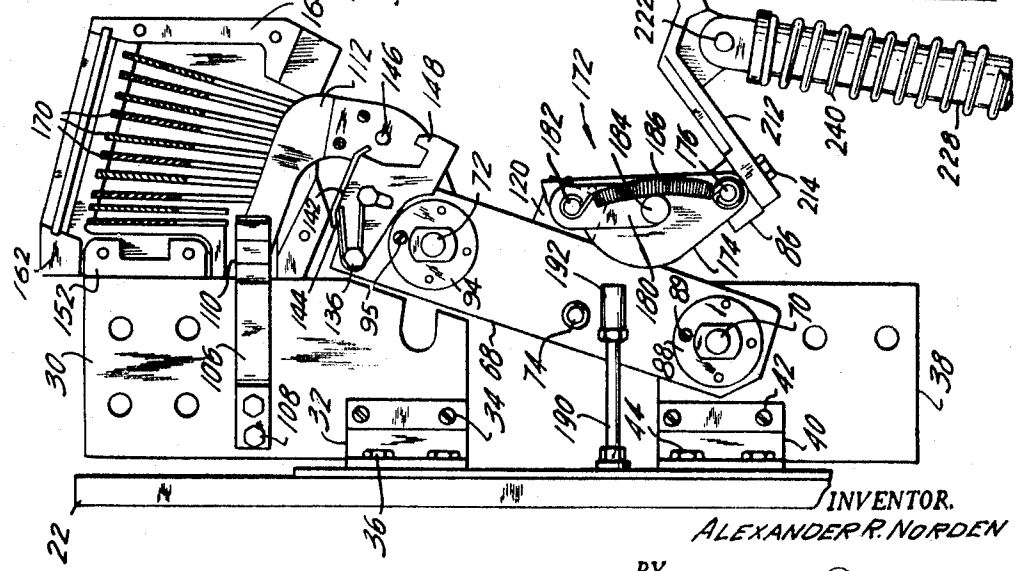


FIG. 3



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FIG. 5

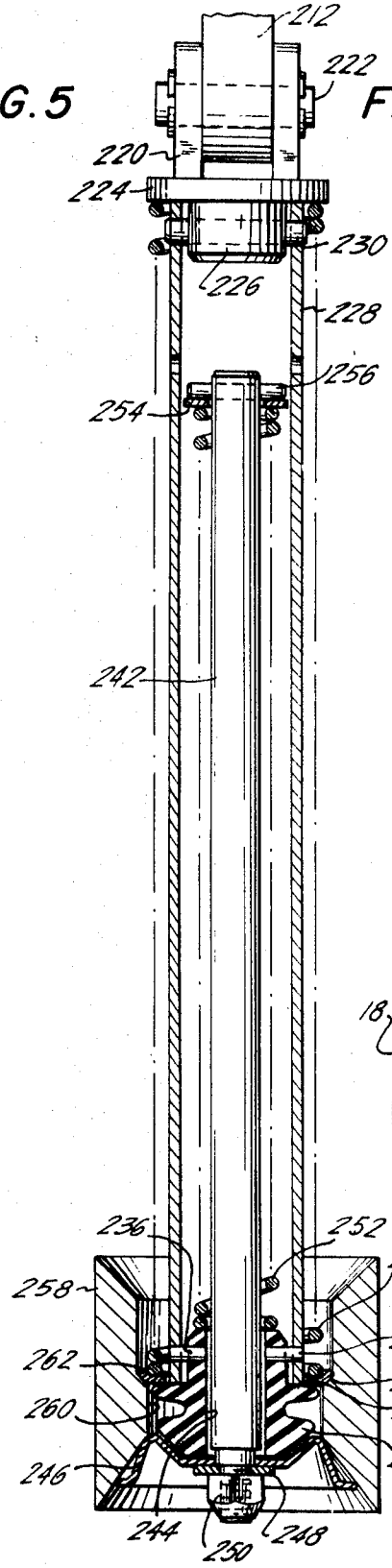


FIG. 6

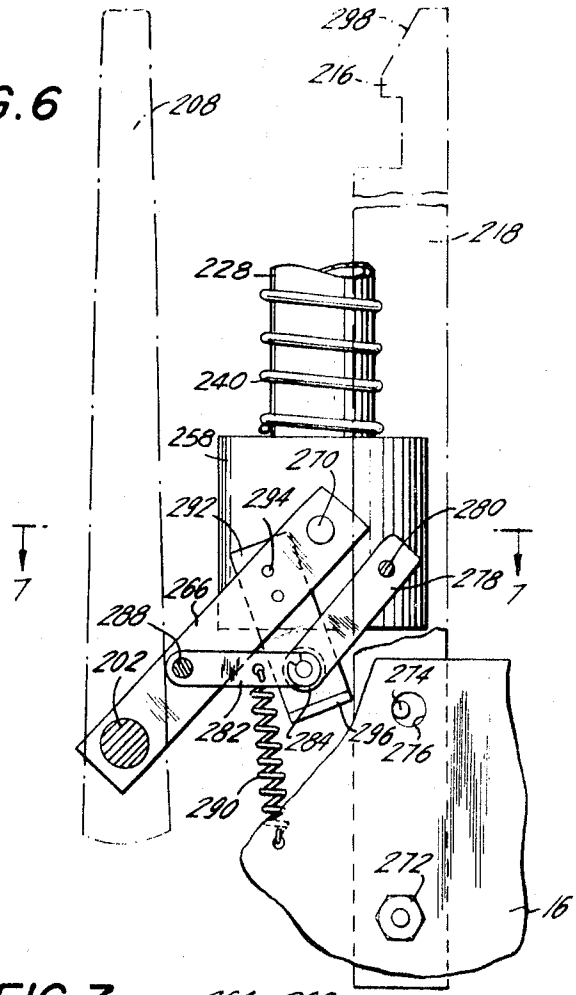
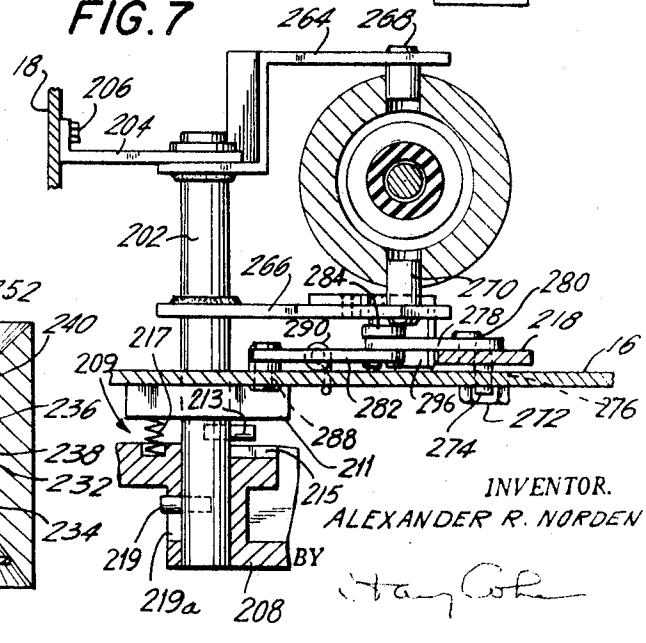
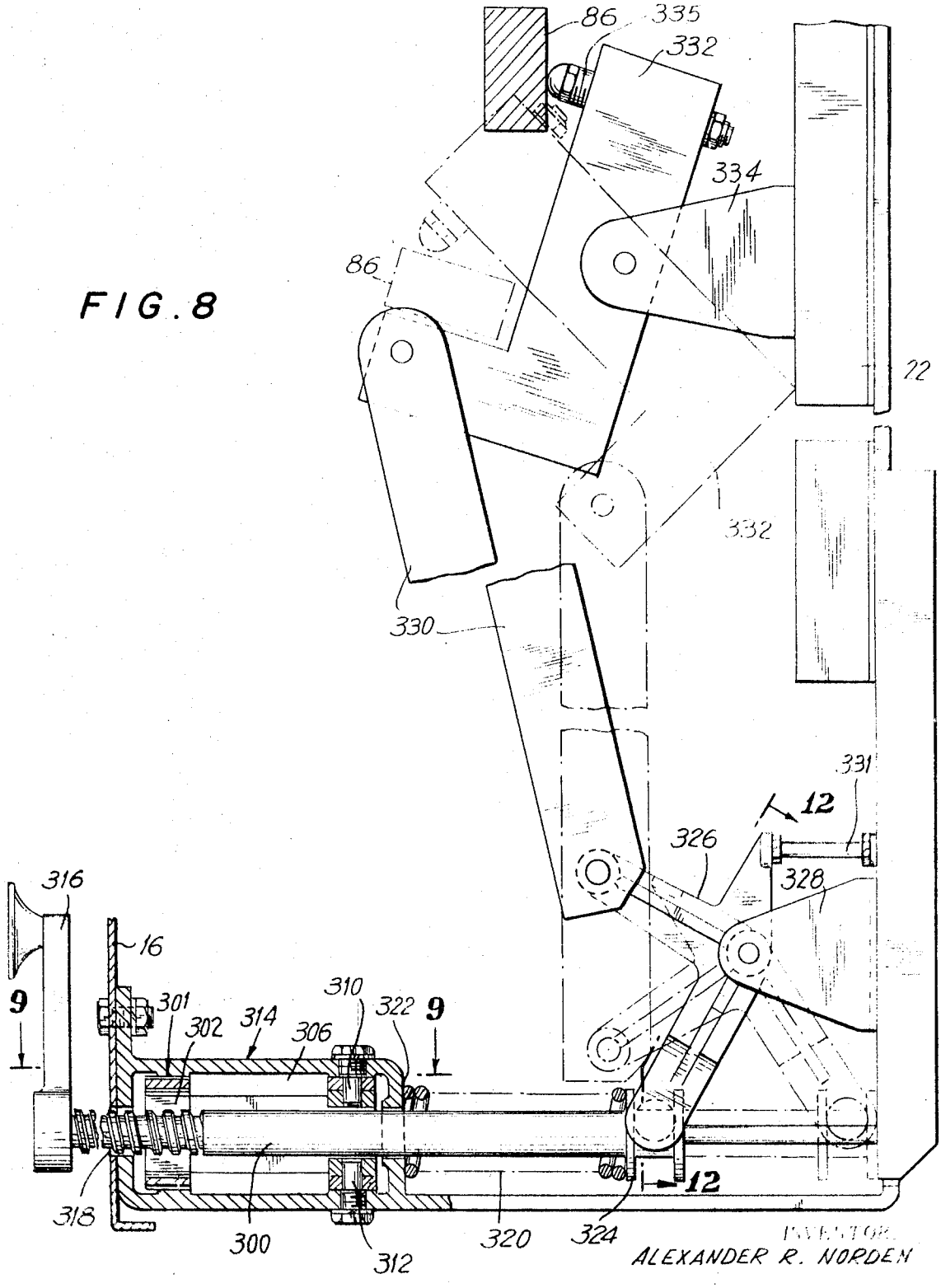


FIG. 7



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FIG. 8

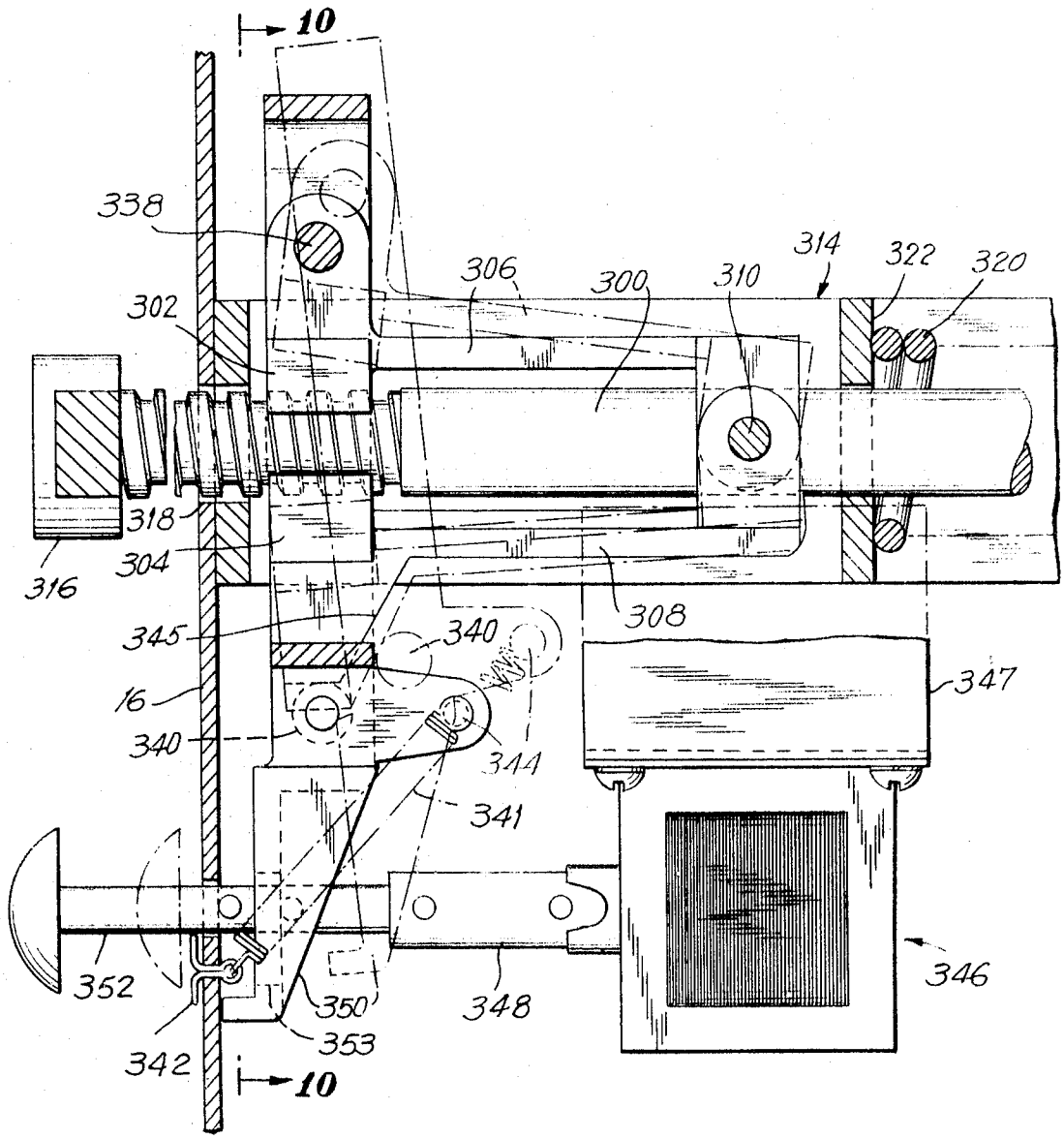


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FIG. 9



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FIG. 10

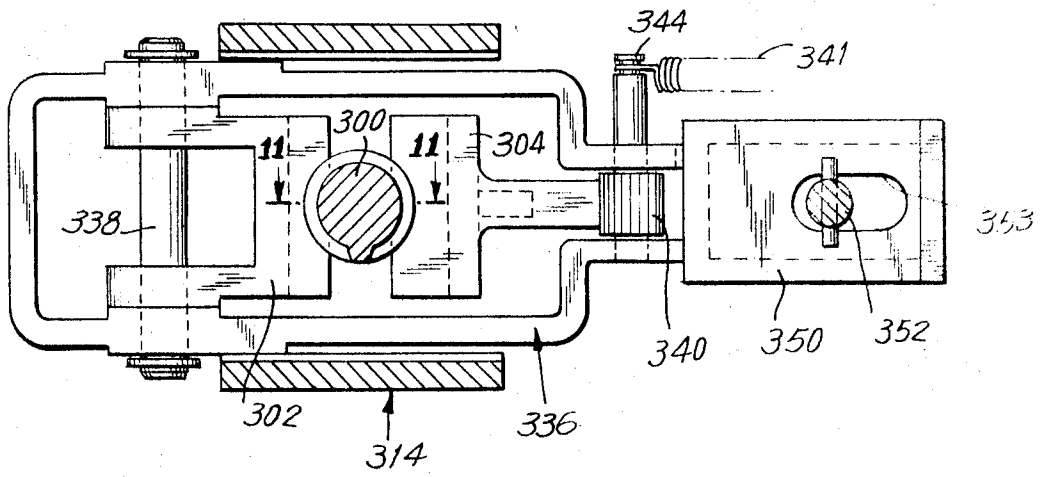


FIG. 12

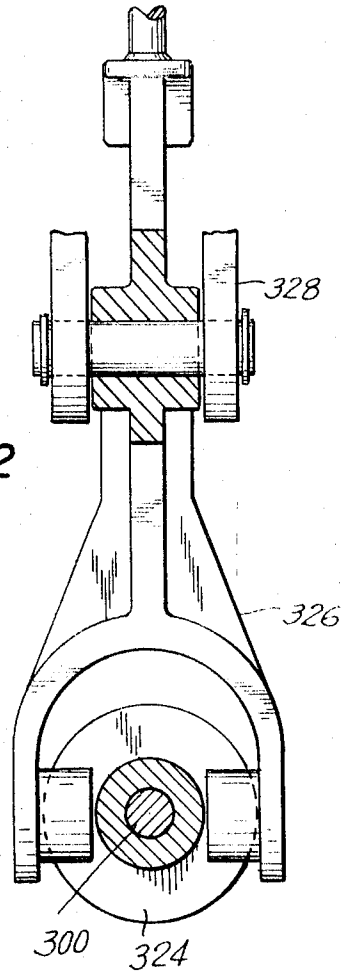
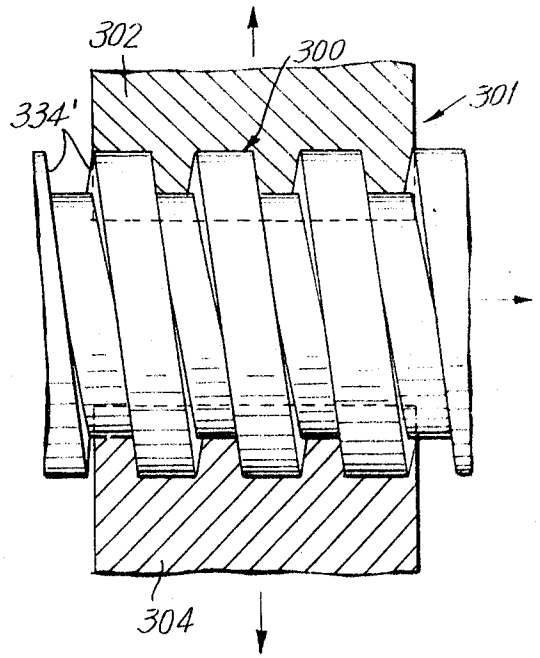


FIG. 11



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ELECTRIC SWITCH WITH RELEASABLE SCREW-THREADED SPRING CHARGING MEANS

This is a continuation-in-part of my Application Ser. No. 599,904 filed Dec. 7, 1966, now U.S. Pat. No. 3,496,319, issued Feb. 17, 1970.

BACKGROUND OF THE INVENTION

This invention relates to a high current quick make and quick break switch which is normally manually operable to effect rapid closing and rapid opening of the switch. In the invention described in the above identified application, an arc chute is provided for each of a plurality of lines which are connected by main and auxiliary contacts and there is an interlock between the movable companion main and auxiliary contacts which prevents engagement of the main movable contact with the companion stationary contact if the companion arc chute is not in place, said interlock being released to permit closing of the companion main contacts if the arc chute is in place.

OBJECTS OF THE INVENTION

One object is to provide a simple and rugged stored energy mechanism to effect rapid opening movement of the switch without requiring operation of the normal manually operable handle.

Another important object is to provide a mechanism as above stated and which will not interfere with the operation of the normal switch actuating mechanism and will not affect the normal electrical and mechanical functions of the switch.

Another object is to provide a normally manually operable switch with a stored energy mechanism which can be conditioned to open the switch by either remote or manual control without actuation of the normally manually operable handle.

These and other objects, features and advantages of the invention will become apparent from the following description considered in connection with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an embodiment of this invention, showing the switch in its open position, and with one arc chute removed for the purpose of illustration;

FIG. **2** is a right side detail view of the contact assemblies, showing the contacts in their fully open disposition;

FIG. **3** is a left side detail view of the contact assemblies, showing the auxiliary arcing contacts in closed disposition and the main contacts still open, all with the left half of the arc chute removed for the purpose of illustration;

FIG. **4** is a left side detail view of the contact assemblies in their fully closed positions, with the left half of the arc chute removed for the purpose of illustration;

FIG. **5** is a front detail view of the switch operating mechanism;

FIG. **6** is a front detail view of the switch operating mechanism in the switch closed position;

FIG. **7** is a cross-sectional view of FIG. **6** taken along the plane FIG. **6–6**;

FIG. **8**. is a view taken on the line **8–8** of FIG. **1**;

FIG. **9** is a view taken on the line **9–9** of FIG. **8**;

FIG. **10** is a view taken on the line **10–10** of FIG. **9**;

FIG. **11** is a view taken on the line **11–11** of FIG. **10**; and

FIG. **12** is a view taken on the line **12–12** of FIG. **8**.

DETAILED DESCRIPTION OF THE INVENTION

The switch which is shown in FIG. **1** is supported on a frame provided by two rear upstanding angles **12** and **14**, a front plate **16**, and two sideplates **18** and **20**. An upper dielectric back panel **33** is mounted to and between the angles **12** and **14**, as by a plurality of bolts and nuts **24**. A lower dielectric back panel **26** is mounted to and between the angles **12** and **14**, as by a plurality of bolts and nuts **28**.

Three lines or phases are here shown as being simultaneously switched. Each phase includes: A line terminal **30**, which is secured to and between two angles **32, 32**, as by nuts and bolts **34**, and which angles are secured to the upper dielectric panel **22**, as by a plurality of nuts and bolts **36**. An upper fuse terminal **38**, which is secured to and between two angles **40, 40**, as by a plurality of nuts and bolts **42**, and which angles are secured to the upper dielectric panel **22**, as by a plurality of nuts and bolts **44**. A lower fuse and load terminal **46**, which is secured to and between two angles **48, 48**, as by a plurality of nuts and bolts **50**, and which angles are secured to the lower dielectric panel **26**, as by a plurality of nuts and bolts **52**. A fuse **54** has an upper terminal **56** which is secured to the upper fuse terminal **38**, as by a plurality of nuts and bolts **58**, and a lower terminal **60** which is secured to the lower fuse terminal **46**, as by a plurality of nuts and bolts **62**. The various angles **32, 40** and **48** each have a plurality of fins **64** formed thereon for rapid heat radiation.

As best seen in FIGS. **2, 3**, and **4**, a main moving contact **66** comprises a pair of bars **68** which are pivotally mounted to and astride the upper fuse terminal by a lower cross-shaft **70**. The pair of bars **68** is also provided with an upper cross-shaft **72** and a cross-rod **74**. The right end of the lower cross-shaft **70** is integral with a crank **76**, exterior to the right bar, having a short arm **78** and a long arm **80**. The distal end of the long arm **80** terminates in a right angle **82** which is secured, as by a plurality of nuts and bolts **84**, to a dielectric crossbar **86**. The left end of the lower cross-shaft **70** is threaded into a nut **88**, exterior to the left bar, which is fixed to the left bar, as by a machine screw **89**. The right end of the upper cross-shaft **72** is integral with a crank **90**, exterior to the right bar, having a short arm **92**. The left end of the cross-shaft is threaded into a nut **94**, exterior to the left bar, which is fixed to the left bar, as by a machine screw **95**. The distal ends of the short arms **78** and **92** are interconnected by a connecting rod **96**. Downward movement of the connecting rod, and associated rotation of the cranks **76** and **90** and their respective cross-shafts **70** and **72** draws the pair of bars closer to each other.

In the main contact open position, shown in FIG. **2**, the connecting rod **96** is in its upper position. In the intermediate position, shown in FIG. **3**, the bars **68** are swung upwardly about the lower cross-shaft **70**. The lower corner **98** of the terminal **30** is cut away to clear the bars in the intermediate position. The connecting rod remains in its upper position. In the fully closed position, shown in FIG. **4**, the bars **68** are swung upwardly further to overlap the terminal **30**. A notch **100** is cut into the terminal **30** to receive the upper cross-shaft **72**. The connecting rod is in its lower position, and the bars **68** are clamped onto the terminal **30** and a terminal **38**.

A relatively movable, auxiliary arcing contact assembly **102** is carried by each main moving contact **66**. A fixed, auxiliary arcing contact assembly **104** is secured to each line terminal **30**. The assembly **104** includes a pair of spring blades **106** which are respectively secured to each side of the terminal **30**, as by a plurality of nuts and bolts **108**. The distal ends of the blades each have a reflex bend **110** therein to form a female contact. The assembly **102** has an outline which approximates a question mark. The upper end **112**, which serves as the male contact, is advantageously made of a solid bar. The lower end **114** is bifurcated, and is advantageously made of a pair of bars secured to the upper end, as by a plurality of nuts and bolts **116**. The lower end **114** is pivotally mounted between the bars **68** by the cross-rod **74** passing through a journal **118** mounted through the bars. A second dielectric crossbar **120** is secured to each of the pair of bars **68**, as by a plurality of machine screws **122**. A compression spring **124** is mounted on one leg of a U-shaped guide **126**. The reflexed end of the guide and the lower end of the spring are disposed in a blind bore **130** in the crossbar **120**. The upper end of the spring is disposed in a notch **132** out into both bars **114**, while the upper ends of the guide pass beyond the notch between the pair of bars **114**. The spring is thus captured.

A pair of latches **134** are respectively mounted to the upper ends of the bars **68**. Each latch **134** is pivoted to the bar **68**, as by a machine screw **136**. An elongated hole **138** is cut into the latch to pass the shank of a machine screw **140**, while the head of the screw **140** precludes lateral movement of the latch. The upper portion **142** of the latch is bent over to form a camming surface. A hairpin spring **144** is disposed with its reflex portion under the head of the screw **136**, and its legs between the cam **142** and the screw **140**, to bias the latch upwardly. A cross-pin **146** is secured through the upper part of the lower end portion **114** of the movable arcing contact assembly **102**. A hook **148** is formed into each latch **134** and this hook is normally biased upwardly by the spring **144** when the switch is in its open position to engage behind the cross-pin **146**. When the latch is so engaged, the main contact bars **68** cannot swing upwardly without similar movement of the movable arcing contact assembly **102**. The compression spring **124** biases the moving auxiliary arcing contact **114** into abutment with the shaft **72** of the crank **90**.

An arc chute assembly **150** is secured to each line terminal **30**. A U-shaped bracket **152** is secured to the edge of the terminal **30**, as by a plurality of machine screws **154**. A pair of chute halves **156** are secured to the bracket, as by a plurality of machine screws **158**, and to each other, as by a plurality of nuts and bolts **160**. The pair of chute halves together form a hollow enclosure in which the making and breaking of the auxiliary arcing contact is performed. The halves have mutually abutting surfaces at portions **162**, **164**, **166** and **168**. The female contact **104** projects into the enclosure between the portions **166** and **168**. The male contact **102** is movable into this enclosure between the portions **164** and **168**. A plurality of grooves are formed into the inner walls of the chute halves to support a plurality of V-notched arc extinguishing plates **170**. The portion **168** projects downwardly and serves as a cam which rides against the camming surface **142** of the latch **134** when the moving contacts **66** and **102** are swung upwardly from the open position of FIG. **2** to the intermediate position of FIG. **3**. The male contact **102** passes into the enclosure, between the bifurcations of the V-notched plates **170** above the portion **168** into the female contact **110** until it abuts the edge of the terminal **30**. Normally, each portion **168** will cam its respective latch **134** downwardly releasing the movable main contact assembly **66** for movement independently of the auxiliary arcing contact assembly **102**. However, should any one of the arc chute halves **156** be missing from any of the terminals **30**, then none of the contact assemblies **66** will move beyond the intermediate position of FIG. **3**, since all of the main contacts are secured to the second dielectric crossbar **120**.

Any arcing between the auxiliary arcing contacts **104** and **102** as they make or break will be blocked by the respective portions **168** of the arc chute from the main contact assembly **66**. Any ionized gas will be drawn up between the plates **170** and will be blown out the top of the arc chute between the projections **162** and **164**. On break motion particularly, when the arcing contacts first separate, the portion **168** ensures that the lowest potential path for the arc is between the arcing contacts, rather than between one arcing contact and the and the other main contact.

The first and second dielectric crossbars **86** and **120** are interconnected by a pair of toggle assemblies **172**. Each toggle assembly includes a cam **174** which is pivotally mounted at its lower end, as by a capped machine screw **176**, to the crossbar **86**, and which has a notch **178** at its upper end. An arm **180** is pivotally mounted at its upper end, as by a capped machine screw **182**, to the crossbar **120**, and is pivotally mounted at its lower end, as by a spooled rod **184**, to the middle of the cam **174**. A tension spring **186** is secured to and between the screws **182** and **176**, and around the spooled rod **184**. In the locked position of the toggle assemblies shown in FIGS. **2** and **3**, the notch **178** of the cam sits on the cap of the screw **182**. A pair of striker assemblies **188** are secured to the upper dielectric back panel **22** in line with the respective toggle assemblies. Each striker assembly includes a bolt **190** secured to the panel **22** and a cap **192**. When the moving main contact assembly **66** moves from the intermediate position of FIG. **3** to the closed position of FIG. **4**, the cap **192** of the striker assembly abuts the edge of the cam **174**, moving the pivot **184** over center against the bias of the spring **186**, breaking the toggle, and permitting the crossbar **86** to move upwardly towards the crossbar **120**. Upward movement of the crossbar **86** swings the crank arm **80** upwardly and the connecting arm **96** downwardly; rotating both cranks **76** and **90** to clamp the bars **68** tightly against the terminal **30** and the terminal **38**.

Quick make and break operation of the switch is provided by an operator assembly **200**. The operator assembly includes a shaft **202** which is journaled through the front plate **16** to an intermediate plate **204** and which plate is secured to the sideplate **18**, as by nuts and bolts **206**.

In accordance with the present invention, when the switch is provided with stored energy remote control mechanism for the opening operation of the switch, as hereinafter described, there is a releasable connection **209** between operating handle **208** and shaft **202**. For this purpose shaft **202** extends forwardly of front plate **16** and has a rotary bearing in member **211** secured to said plate, handle **208** being releasably connectable to shaft **202** by engagement of the pin **213**, fixed to shaft **202**, in the slot **215** of handle **208** in opposition to the compression spring **217** which normally holds handle **208** in retracted position against the stop **219** on the forward end of shaft **202**, which extends in a slot **219*a*** in handle **208**. When operating handle **208** is out of operating engagement with shaft **202** it pivots on said shaft into engagement with the stop **221** on front plate **16**. It will be understood that slot **219*a*** is wide enough to permit turning of shaft **202** for opening of the switch under remote control without rotation of the handle **208**.

A charging spring assembly couples rotation of the shaft **202** to movement of the dielectric crossbar **86**. The charging spring assembly includes a bracket **212** which is secured at one end to the crossbar **86**, as by a plurality of nuts and bolts **214**, and at its other end is adapted to interlock with a hook **216** on the end of a detent **218**. The bracket is pivotally secured to a clevis **220**, as by a pin **222**. The clevis is integral with a cap **224** and a stud **226**. The cap is secured to the top of a tube **228**, as by a pin **230** through the stud and the tube. The bottom of the tube **228** rests on a shoulder **232** of a spool **234** and is secured thereto, as by two pins **236**. A cup shaped washer **238** also sits on the shoulder **232**. A helical compression spring **240** is disposed on the tube **228** and is captured between the plate **224** and the washer **238**. A rod **242** is disposed through a longitudinal bore **244** in the spool. The lower end of the rod is threaded and is secured to a convoluted washer **246** by a washer **248** and a nut **250**. A helical compression spring **252** is disposed on the rod **242** and is captured between the top of the spool **234** and a washer **254** and a cross-pin **256** through the top of the rod. A cup **258**, having a longitudinal bore **260** which clears the spool and a shoulder **262** which engages the washer **238**, is supported on the convoluted washer **246**. Two crank arms **264** and **266** are secured to the shaft **202**, as by welding, and are pivotally secured to the cup **258**, as by pins **268** and **270** respectively.

The detent **218** is pivotally mounted to the front plate **16**, as by a nut and bolt **272**, and is limited in its swing by a pin **274** fixed to said detent and projecting through a relatively larger hole **276** in the front plate. An arm **278** is pivotally secured at one end to the detent **218**, as by a nut and bolt **280**, and at its other end to one end of an arm **282** by a roller, a stud and a C spring **284**. The other end of the arm **282** is pivotally secured to the front plate **16**, as by a nut and bolt **288**. A tension spring **290** is connected to and between the arm **282** and the front plate **16** to bias the detent **218** towards the bracket **212**. A right angle **292** is secured to the arm **266**, as by a plurality of machine screws **294** and has a foot portion **296** which is disposed under the roller **284**.

When the switch is in its normal open position, the end of the bracket **212** is under the hook **216** of the detent **218**. Upward rotation of the handle **208**, towards the closed position, swings the brackets **266** and **264** upwardly and slides the cup **258**, the washer **262**, the spring **240**, the clevis **220** and the bracket **212** upwardly to abut the bracket against the hook **216**. Further rotation of the handle compresses the spring **240** against the clevis, and when the spring is fully compressed providing a direct drive, until the foot portion **296** engages the roller **284** to swing the detent **218** away from the bracket **216**, thereby releasing the bracket from the hook. The now released compressed spring fires the bracket **212**, the dielectric crossbar **86**, the toggled locked thereto dielectric crossbar **120**, the main moving contact assemblies **66** and the auxiliary arcing moving contact assemblies **102** upwardly. On normal operation, sequentially, the auxiliary male contact **112** will mate with the auxiliary female contact **110**, the arc chute portion **168** will strike open the latches **134**, the main contact bars **68** will overlap the terminal **30**, the striker **192** will break the toggle **172**, and the dielectric bar **86** will rotate the cranks **76** and **90** to clamp the bars **68** on the terminal **30** and the terminal **38**.

If one or more of the arc chute halves **56** is missing, the respective latch **134** will not be opened and the switch will halt in the intermediate open position of FIG. **3**.

If a short circuit condition should exist at the instant of closing of the arcing contacts **112** and **110**, the flow of current creates electrodynamic forces having a direction which opposes the closing force of the spring **240** and the momentum of the high inertial mass of the moving contacts.

In the case of a relatively less severe short circuit, these electrodynamic forces are insufficient to prevent the normal closing sequence of the switch. The moving arcing contacts **112** will be driven into engagement with the respective stationary arcing contacts **110** by the respective latches **134** engaged with their respective cross-pins **146**. Subsequently, the latches will be disengaged from the cross-pins by the respective camming portions **168** of the arc chutes and the main moving contacts will close onto the main stationary contacts. In due course, depending on the current and the fuse ratings, the fuses will blow.

In the case of a very severe short circuit, these electrodynamic forces will equal or exceed the closing force of the spring **240** and the momentum of the high inertia mass of the moving contacts. Under such conditions, the fuses will blow within one-half cycle, while more than one-half cycle will be required to either drive the moving arcing contacts in their closing direction from the commencement of mating with the stationary arcing contacts to the point of disengagement of the latches **136** from their respective cross-pins, or to arrest and reverse the direction of movement of the high inertia mass of the moving contacts driven by the spring **240**. Therefore, within this one-half cycle the fuses will blow; and the light springs **124** will be compressed and the moving contacts will be arrested by the cross-pins pushing against the latch hooks **148** so that the latches **136** will not reach the camming portions **168** and will not be disengaged from their respective cross-pins, and the main moving contacts will not mate with the main stationary contacts. Should the electrodynamic forces exceed the driving force, and the moving contacts be thrown back, such forces will be shock-absorbed and cushioned by the compression of the spring **240**, and will not be directly transmitted to the handle.

When the switch is in its normal closed position, downward rotation of the handle **208** towards the open position, swings the brackets **266** and **264** downwardly and slides the cup **258**, the convoluted washer **246**, and the rod **242** downwardly, compressing the inner spring **252**, when the spring **252** is fully compressed, the handle **208** is in direct drive with the clevis **220** and swings the bracket **212** downwardly, swinging the dielectric crossbar **86** downwardly and locking the toggles **172**. This releases the compressed spring **252** which now fires the bracket **212** and the moving contact assemblies **66** and **102** downwardly. A ramp **298** is formed on the corner of the detent above the hook **216** so that the bracket **212** cams the detent aside as it moves downwardly to the open position. It should be noted that when the dielectric crossbar **86** is swung downwardly, it rotates the crank **76** and **90** to unclamp the bars **68** from the terminal **30**. At this time the end **112** of the moving auxiliary arcing contact is abutting the edge of the terminal **30**, and the compression spring **124** biases the dielectric crossbar **120** and the main moving contact bars **68** away from the terminal **30**. In the event that a chute is missing and the moving contact is halted in the intermediate position of FIG. **3** with the toggle unbroken, on opening movement the handle will swing the moving contact bars downwardly without any compression of the spring **252**.

Referring now to the provision for remote control of the switch opening operation the mechanisms illustrated more particularly by FIGS. **8** to **10** will now be described.

A screw-threaded rod **300** is releasably engaged by a split nut **301** which comprises parts **302** and **304** carried by arms **306** and **308** pivotally mounted on shouldered screws **310** and **312** for movement into and out of engagement with the threaded portion of rod **300** in frame **314** which is secured to plate **16**. A handle **316** is provided at the front of plate **16** (FIGS. **1** and **8**) for rotating rod **300** which extends through an opening **318** in said plate. When said split nut **301** engages rod **300**, the latter is longitudinally movable in one direction, pursuant to rotation of the handle, to compress, i.e. to charge, spring **320** which is captured between the end **322** of frame **314** and a collar **324** fixed to said rod. When nut **301** is released from rod **300** the latter is movable longitudinally by the charged spring **320**, without rotation of said rod, toward panel **22**.

Rod **300** is coupled operatively to bar **86** by mechanism including bellcrank lever **326** which is pivotally mounted on stationary bracket **328** and is pivotally connected at one end to collar **324** and at its other end to the lower end of link **330**. A stop **331** limits the movement of bellcrank **326** in a clockwise direction viewing FIG. **8** and thereby limits the longitudinal movement of rod **300** to the right. Said link **330** is pivotally connected at its upper end to bellcrank lever **332** which is pivotally mounted on stationary bracket **334**. The upper arm of lever **332** carries an adjustable member **335** which bears against bar **86** for moving said bar **86** to open the switch when split nut **301** releases rod **300**.

It will be noted that the rib-defining grooves of rod **300** are such that the confronting sides **334'** of each groove define an obtuse angle therebetween so that the discharging force of spring **320**, when latch arm **336** (FIGS. **9** and **10**) which is pivotally mounted nut part **302** by the pivot **338** is disengaged from nut part **304**, is effective to release the nut **301** from rod **300** so that the latter can move longitudinally without rotation. More particularly, latch arm **336** carries a roller **340** which engages nut part **304** when nut **301** is in threaded engagement with rod **300**. Spring **341** is connected at one end to plate **16** as indicated at **342** (FIG. **9**) and at its opposite end to pin **344** on arm **308**. Nut part **304** has an inclined portion **345** over which roller **340** can move to and from the two positions shown in FIG. **9**, the position of said roller at the left being in the latching position of arm **336** and the position of said roller at the right being in the unlatched position of said arm.

A solenoid **346** is mounted on a bracket **347** secured to casing **314**. The solenoid plunger **348** is connected to arm **350** of latch arm **336** so that when the solenoid in energized, which can be done by closing a switch at any selected location, roller **340** is retracted and nut **301** is moved out of operative engagement with rod **300**. A manually operable pin **352** accessible at the front of plate **16** is operatively connected to arm **350** in slot **353** to move said arm for disengaging nut **301** with and from rod **300**.

While I have shown and described the preferred embodiment of my invention, it will be understood that the invention may be embodied otherwise than as herein specifically illustrated or described, and that certain changes in the form and

arrangement of parts and in the specific manner of practicing the invention may be made without departing from the underlying idea or principles of the invention within the scope of the appended claims.

What I claim is:

1. An electric switch comprising, a stationary contact member, a companion movable contact member, a fuse associated with one of said contact members, mechanism coupled to said movable contact member for opening and closing the switch manually operable means for normally actuating said mechanism to open and close the switch releasably coupled to said mechanism and means operable independently of said manually operable means to actuate said mechanism to open said switch after it is closed by actuation of said mechanism by said manually operable means said independently operable means comprising rotary screw-threaded means, spring means which is stressed by rotation induced longitudinal movement of said screw-threaded means in one direction coupled to said mechanism for rendering it potentially operable to actuate said switch opening mechanism, said spring means being coupled to said screw-threaded means for biasing said screw-threaded means for longitudinal movement in a direction opposite to said one direction, and means coupled to said screw-threaded means for releasably preventing nonrotary longitudinal movement of the screw-threaded means in said opposite direction and permitting said longitudinal movement of said screw-threaded means in said opposite direction by said spring means for actuation of said switch opening mechanism.

2. An electric switch comprising switch closing mechanism and switch opening mechanism, means to actuate said switch opening mechanism comprising rotary screw-threaded means, spring means which is stressed by rotation-induced longitudinal movement of said screw-threaded means in one direction coupled to said mechanism for rendering it potentially operable to actuate said switch opening mechanism, said spring means being coupled to said screw-threaded means for biasing said screw-threaded means for longitudinal movement in a direction opposite to said one direction, and means coupled to said screw-threaded means for releasably preventing nonrotary longitudinal movement of the screw-threaded means in said opposite direction and permitting said longitudinal movement of said screw-threaded means in said opposite direction by said spring means for actuation of said switch opening mechanism.

3. An electric switch according to claim 2, wherein said screw-threaded means comprises a screw-threaded rod, the companion confronting sides of rib-defining grooves of the threads defining an obtuse angle therebetween, a split nut coupled to said threaded rod and releasable therefrom to permit said nonrotary longitudinal movement of said rod.

4. An electric switch according to claim 1 wherein said screw-threaded means comprises a screw-threaded rod, the companion confronting sides of rib-defining grooves of the threads defining an obtuse angle therebetween, a split nut coupled to said threaded rod and releasable therefrom to permit said nonrotary longitudinal movement of said rod.

5. An electric switch according to claim 3, wherein said split nut comprises two parts, a pivot on which said parts are pivotally mounted for engagement with and disengagement from said rod, and means for moving said parts of the nut into and out of engagement with said rod.

6. An electric switch according to claim 5 wherein the means for moving said parts of the nut into engagement with said rod comprising manually movable means releasably coupled to said parts of the nut and movable to a projected position and to a retracted position.

7. An electric switch according to claim 5 wherein the means for moving said parts of the nut into engagement with said rod comprises camming means releasably coupled to one of said parts of the nut and comprising a manually operable means for actuating said camming means.

8. An electric switch according to claim 5, wherein the means for moving the split nut out of engagement with said rod comprises said stressed spring acting on said rod when said movable means which is releasably coupled to the nut is moved to a retracted position.

9. Stored energy mechanism comprising, longitudinally movable screw means, spring means stressed by rotation-induced longitudinal movement of said screw means in one direction, said spring means being coupled to said screw means for biasing said screw means for longitudinal movement in a direction opposite to said one direction, and releasable means coupled to said screw means for releasably preventing nonrotary longitudinal movement of the screw means in said opposite direction and permitting said longitudinal movement of said screw means in said opposite direction by said spring means.

10. Stored energy mechanism according to claim 9, wherein said screw-threaded means comprises a screw-threaded rod and said releasable means comprising a split nut having separable parts disengageable from said rod to permit said longitudinal movement of said rod.

11. Stored energy mechanism according to claim 10 wherein the companion confronting sides of rib-defining grooves of the threads of said rod define an obtuse angle therebetween.