

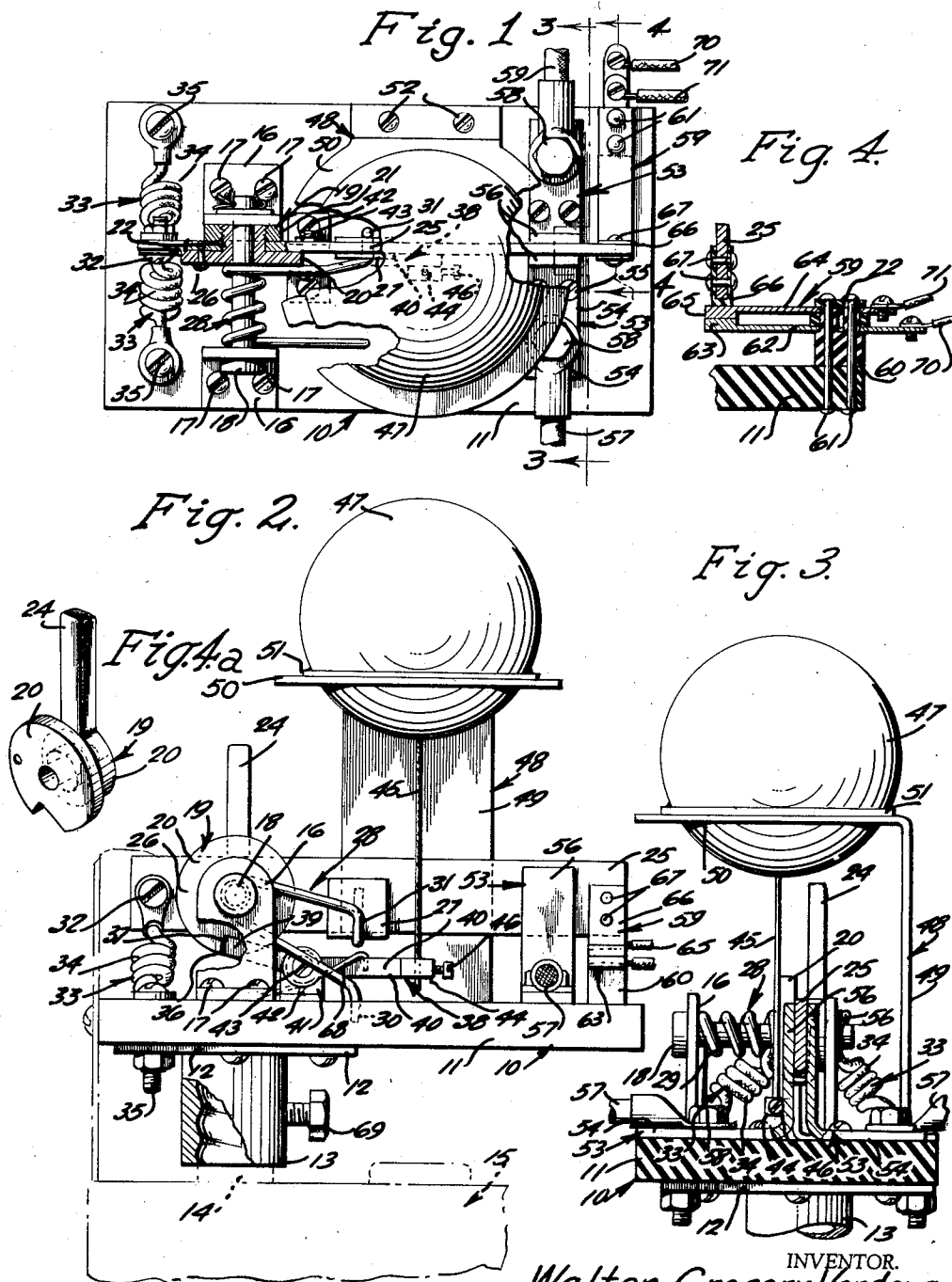
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INERTIA SAFETY SWITCH

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INERTIA SAFETY SWITCH
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1 Claim. (Cl. 200—61.45)

This invention relates to a switch, and more particularly to a safety switch for interrupting an electrical circuit, as for example upon the occurrence of an accident or the like.

The object of the invention is to provide an inertia safety switch which is adapted to be used in a suitable location such as in a vehicle whereby in the event of a collision or accident or crash or the like, the switch will be actuated to automatically break or interrupt the electrical circuit of the vehicle so that there will be less likelihood of a fire resulting from a short circuit or the like and wherein damage to the vehicle and possible injury will be minimized or prevented.

Another object of the invention is to provide an inertia safety switch which includes a member that is adapted to be moved from its seat upon the occurrence of a certain condition such as upon the occurrence of an accident and wherein when this member moves from its seat, it will cause certain parts to be moved whereby an electrical circuit in which the switch is installed will be opened, and wherein when desired, the switch can be readily manually reset so as to permit normal use of the vehicle or other member in which the device is mounted.

A further object of the invention is to provide an inertia safety switch which is simple in construction, very inexpensive to manufacture, and which is reliable in use.

Other objects will appear as the description proceeds. The invention will be first hereinafter described in connection with the accompanying drawings, which constitute a part of this specification, and then more specifically defined in the claim at the end of the description.

In the accompanying drawings, in which similar reference characters are used throughout the several views to designate corresponding parts.

FIGURE 1 is a plan view of the inertia safety switch of the present invention, with parts broken away and in section.

FIGURE 2 is a side elevational view of the inertia switch, with parts broken away and in section.

FIGURE 3 is a sectional view taken on the line 3—3 of FIGURE 1.

FIGURE 4 is a sectional view taken on the line 4—4 of FIGURE 1. FIGURE 4a is a perspective view of a portion of the switch of the present invention.

Referring in detail to the drawings, the numeral 10 indicates the inertia safety switch of the present invention which is shown to comprise a horizontally disposed insulated base 11, and arranged below the base 11 is a plate 12 which is adapted to be made of a suitable conductive material such as a suitable metal, and depending from the plate 12 is an adaptor 13 for engaging a terminal 14 of a battery 15, and wherein the battery 15 may be the battery of a vehicle such as an automobile.

Arranged contiguous to the upper surface of the base 11 and secured thereto as for example by means of screws or securing elements 17, is a pair of L-shaped lugs 16, and the numeral 18 indicates a pin or shaft which extends between the vertical legs of the lugs 16 and which is supported by these lugs as shown in the drawings.

There is further provided a body member which is indicated generally by the numeral 19, and the body member 19 is adapted to be made of a suitable insulated material and comprises a first section 20 and a second section 21, the sections 20 and 21 being of generally circular formation, and wherein the section 20 is of larger di-

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ameter than the section 21. The body member 19 further includes a cylindrical section 22 and there is also provided an annular groove 23 between the sections 20 and 21. A reset handle 24 extends upwardly from the section 19 and is secured thereto or formed integral therewith and this handle 24 is adapted to be used for resetting the switch of the present invention, as later described in this application.

The numeral 25 indicates a movable blade which is provided with a suitable aperture or opening that engages the section 22 and groove 23 of the body member 19, as for example as shown in FIGURE 1. The blade 25 is suitably affixed to the section 20, as for example by means of a securing element 26. The numeral 27 indicates a U-shaped yoke which is suitably affixed to the blade 25.

As shown in the drawings there is provided a spring member 28 which includes a coiled portion 29 that is circumposed on the pin 18, and the spring member 28 includes an end portion 30 which is anchored or affixed to the base 11, while the other end 31 of the spring member 28 is arranged in engagement with the yoke 27 on the blade 25.

Extending through one end of the blade 25 is a securing element 32, and there is provided a pair of conductors 33 which each have an end connected to the securing element 32, and the conductors 33 each include intermediate coiled portions 34. The other ends of the conductors 33 are arranged in engagement with securing elements 35 which are electrically connected to the plate 12.

The first section 20 of the body member 19 is provided with a recess or notch 36 that defines a shoulder 37. The numeral 38 indicates a bar which includes a first and second portion 39 and 40, and these portions 39 and 40 are off-set or arranged angularly with respect to each other. The bar 38 is pivotally mounted on a securing element or pin 43 which extends between a pair of L-shaped support members 41, and the support members 41 are suitably affixed to the base 11, as for example by means of screws 42. The free end of the section 39 of the bar 38 is adapted to engage the recess 36 and shoulder 37 of the section 20 of the body member 19 as for example when the parts are in the position shown in FIGURE 2.

The end of the portion 40 of the bar 38 is provided with an enlargement or projection 44, and the numeral 45 indicates a cable or line which has its lower end fastened in the projection 44, as for example by means of a set screw 46. The upper end of the cable 45 is suitably affixed to the weight or ball 47.

As shown in the drawings there is provided a stand 48 which includes an upright member 49 as well as a horizontally disposed circular seat 50, and the stand 48 may be secured to the base 11 in any suitable manner, as for example by means of securing elements 52. A circular band 51 is suitably affixed to the ball 47.

The numeral 53 designates each of a pair of L-shaped brackets which each comprise a horizontally disposed leg 54 that is secured to the base as for example by means of securing elements 55, and each bracket 53 further includes a vertically disposed leg 56. Conductors 57 are arranged in engagement with elements 58 that are connected to the bracket 53.

The numeral 59 indicates a switch assembly which is arranged adjacent an end of the base 11, and the assembly 59 includes an insulated supporting block 60 which may be secured to the base 11 as for example by means of pins or securing elements 61. This assembly 59 includes a lower arm 62 which has a contact 63 on its upper outer end, and there is further provided an upper arm 64 which has a contact 65 for selectively engaging the con-

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tact 63 on the lower arm 62. A U-shaped bushing 66 of insulated material is affixed to an end of the blade 25 as for example by means of rivets or securing elements 67.

The numeral 68 indicates a spring member which is arranged in engagement with the portion 40 of the bar 38, as for example as shown in FIGURE 2.

Thus, it will be seen that according to the present invention there has been provided an inertia safety switch, and with the parts arranged as shown in the drawings, it will be seen that the inertia safety switch is adapted to be arranged in a suitable location as for example in a vehicle or other member such as a boat, aircraft or the like, and wherein the parts can be readily adjusted as desired in order to provide that actuation shall take place at the proper time, and wherein when an emergency occurs such as a crash, the electrical circuits will become inactivated or disconnected. Thus, spilled gasoline or the like will not be ignited so that there will be less likelihood of injury to personnel or damage to the vehicle or other member in the event of a crash. After the accident or the like, when desired, the switch can be reset so as to again connect the electrical circuit to the various components or accessories so that the circuit can be completed when desired.

Normally, the parts are adapted to be arranged in the position shown in FIGURE 2 for example, wherein it will be seen that the ball 47 is supported on the seat 50, and the band 51 which is suitably affixed to the outer surface of the ball 47 engages the upper portion of the seat 50. The cable 45 has its upper end suitably connected to the ball 47, and the lower end of the cable line 45 is connected to the projection 44 on the bar 38 as for example by means of the set screw 46. The bar 38, when in the position of FIGURE 2, has its end portion 39 engaging the recess 36 and shoulder 37 of the section 20 of the body member 19 so that with the parts in the position of FIGURE 2, rotation of the body member 19 is prevented due to the engagement of the end of the bar 38 in the notch or recess 36. However, in the event of an accident or collision, the ball 47 will be dislodged from its seat 50 and this will cause a pull on the line or cable 45 whereby the bar 38 will be pivoted in a counter-clockwise direction on the pin 43, FIGURE 2, so that the end 39 of the bar 38 will be moved out of engagement of the recess 36 so as to permit rotation of the body member 19. The spring member 68 serves to normally maintain or urge the bar 38 in the position of FIGURE 2, but when the weighted ball 47 is dislodged off of the seat 50, the ball will cause the cable 45 to be pulled on with sufficient force to overcome the holding power of the spring 68 so that the end 39 can move out of engagement with the notch 36 in the body member 19. Then, the spring 28 will pivot the blade 25 in a counter-clockwise direction, FIGURE 2, and since the blade 25 is connected to the body member 19 as at 26, it will be seen that with the bar portion 39 out of the recess 36, the body member 19 and consequently the blade 25 will be free to pivot in a counter-clockwise direction, FIGURE 2.

The pin 18 in addition to its other functions, serves as a pivot mounting for the contact blade 25. As the blade 25 moves in a counter-clockwise direction, FIGURE 2, the electrical circuit to the various components or accessories will be opened as later described in this application.

The conductors 33 each include intermediate coil portions 34 which thus function as variable length conductors since as the blade 25 pivots to its various or several positions, the coil portion 35 can expand or contract in order to insure that there will be no binding of the conductors and in order to insure that the electrical circuit will always be properly completed between the blade 25 and element 32 and conductors 33 and securing elements 35.

The blade 25, when in the position of FIGURES 1 and 2 is interposed between the vertical legs 56 of the bracket

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53, and in addition the bushing 66 is engaging the upper arm 64 of the switch assembly 59 whereby the contacts 65 and 63 are in electrical engagement with each other. The adaptor 13 is suitably affixed to the plate 12 or formed integral therewith, and the adaptor 13 is adapted to be connected to a battery terminal such as the battery terminal 14 as for example by means of a set screw or securing element 69.

Suitable material can be used for making the various parts, and the shape and size of the parts can be varied as desired or required.

When the switch 10 is to be reset, the ball 47 can be replaced on its seat 50 and the handle 24 can be manually moved so as to return the parts to the position shown in FIGURE 2 and then the handle 24 can be released and the portion 39 of the bar 38 will engage the recess 36 in order to prevent accidental movement of the parts of the switch.

The flexible electric cables 33 serve to connect the contact blade 25 to the cup or adaptor 13. The numeral 28 indicates the main actuating spring. The member 19 functions as a catch for the trigger or bar 38, and the trigger bar 38 is connected to the ball 47 by means of the cable 45.

The adaptor 13 is threaded internally and is mounted on the pole such as the pole 14 of the battery 15 and is secured in place by means of the screw 69.

In view of the fact that when the motor of a vehicle is operating, the generator is functioning, the battery is not necessary since the generator will supply the current for the ignition and everything else such as for example current from this source can supply live sparks to start a fire in case of an accident. To eliminate this undesirable situation the switch 59 is provided. Thus, when the motor is operating the generator supplies the current, and the battery such as the battery 15 may be disconnected and the motor and everything else will still be functioning with current in all the wires. Thus, it is necessary to eliminate instantly the current from all the wires and the assembly 59 is incorporated in the inertia switch 10 to provide for this. As shown in the drawings, the main contact blade 25 has the non-conductor 66 attached thereto, and the conductors 70 and 71 are adapted to be electrically connected to the generator and voltage regulator of the vehicle. The points or contacts 65 and 63 are supported by the spring arms 64 and 62, and the other ends of the spring arms 64 and 62 are insulated from each other as for example by means of the insulation 72, FIGURE 4, and the conductors 70 and 71 lead to the generator and voltage regulator. The wire leading to the generator is adapted to be armor-plated. The assembly 59 functions as follows. When the main contact blade 25 is in the closed position as for example as shown in the drawings, the points 65 and 63 are in engagement with each other or are closed and the generator is charging and everything is operating in a normal manner. When the blade is in open position, the points 65 and 63 are separated due to the inherent resiliency of the spring arms 64 and 62, so that the generator is cut off from the rest of the electric system of the vehicle. Only the wire from the assembly 59 to the generator may have current in it for a fraction of a second until the motor stops turning and for this reason it should be armored. The assembly 59 is adapted to be arranged perpendicular to the longitudinal axis of the switch 10 in order to conserve space.

Thus, the switch 59 functions as a secondary assembly or switch unit to instantly eliminate all current that circulates in the system and this assembly 59 includes a non-conductor 66 which is firmly attached to the blade 25 as at 67. The points 65 and 63 and the spring arms 64 and 62 are insulated from each other at the area indicated by the numeral 72 and the wires 71 and 70 are connected to the arms 64 and 62 respectively, and one of

these wires leads to the generator while the other leads to the voltage regulator.

Often during a collision or accident involving a vehicle, the vehicle overturns and catches fire and sometimes the injured people are burned in the vehicle and at times there is a short circuit in the wires of the vehicle which produces fire that increases damage to the vehicle and also increases financial loss to the owner of the vehicle. With the automatic switch of the present invention such fires can be minimized or prevented. When the motor vehicle overturns or is lying on its side, the motor may still be working but the mixture of air and gasoline in the carburetor is changed due to the different position of the vehicle and there may be back-firing through the carburetor or the muffler so that if there is any spilled gasoline in the vicinity of the vehicle as is usually the case, such gasoline is ignited and a fire occurs. In addition, when a serious collision occurs or when a vehicle falls off of a highway and is badly damaged there is usually bent and torn metal with sharp edges which cut electric wires or damage the insulation and short circuits often result which ignite the insulation on the wires as well as the upholstery and usually the spilled gasoline, and the automatic switch of the present invention will eliminate the electric current from the wires as well as eliminating the possibility of a short circuit and subsequent fire.

In addition, often there is a continuous blast of a horn which people seem to be having difficulty in stopping and sometimes there is the odor of burning rubber in the vehicle and the present invention can be actuated by the operator of the vehicle to temporarily eliminate the electric current from the wires so as to overcome these difficulties. The inertia safety switch of the present invention will swiftly and automatically eliminate the current from all electric wires in the motor vehicle as soon as the collision occurs or when the vehicle assumes the position which is not horizontal.

In use the ball 47 may be suitably weighted so that it is sufficiently heavy and may be filled with lead if desired and may be approximately two inches in diameter and rest on the seat 50, the band 51 being suitably affixed to the ball 47 for engaging the seat 50. The seat 50 is formed integral with or secured to the upper end of the stand 48, and the stand 48 is connected as at 52 to the base 11. Then, when a collision or accident occurs, regardless from which direction, the ball 47 is moved or tilted off its seat 50 so as to pull on the cable 45 and the cable 45 actuates the trigger bar 38 which slips out of the notch 36 so as to release the contact blade 25 so that the blade 25 will move out of engagement with the receptacle that consists of the brackets 53 so as to break the continuity of the circuit right at its source, namely at the battery. All of the wires are dead, the motor will be turned off and the possibility of a short circuit is eliminated and the danger of a fire and explosion is minimized.

If the vehicle is in the process of overturning, as soon as the vertical plane is off, a certain angular amount such as 45 degrees toward the horizontal, the ball 47 falls off its seat so as to actuate the trigger bar. The contact blade is again released, and the wires of the motor are dead even before the vehicle falls on its side.

In the event that a driver or a garage mechanic or the like finds it necessary to eliminate the electric current from the wires for any of the above named reasons, the mechanism can be actuated manually by pulling on the cable 45 and suitable levers and buttons can be used to facilitate this. The switch can be reset manually as for example by means of the handle 24 at any time after it is actuated. The contact blade 25 is securely insulated from the body of the switch, its axle or pin, the spring

and all releasing mechanisms and is electrically connected by the flexible copper cable 33, to the contact cup or adaptor 13 which is also insulated from the body of the switch and which is located or positioned beneath the switch. The adaptor 13 is adapted to be made of a suitable strong good conductor metal and is threaded internally and has the securing screw 69. The switch makes contact with one pole such as the pole 14 of the battery through the contact cup 13, it is set on the pole, turned one-half or a quarter turn for better and tighter contact and secured with the securing element 59. The receptacle which consists of the L-shaped bracket 53 is electrically connected to the body of the switch. In addition, the body of the switch is also connected to the cable that leads to the self starter as well as to the rest of the electrical system of the vehicle.

Normally the switch will not be needed, but in the event of an accident or the like as previously stated the switch will be actuated in order to help save lives and prevent damage to the various elements.

Minor changes in shape, size and rearrangement of details coming within the field of invention claimed may be resorted to in actual practice, if desired.

A suitable simple cover is provided for the whole switch to keep out dust and grime.

What is claimed is:

In an inertia safety switch, an insulated base, a conductor plate positioned below said base and affixed thereto, an adaptor depending from said plate for engaging a battery terminal, a pair of L-shaped lugs mounted on the upper portion of said base, a pin extending between said pair of lugs, a body member mounted on said pin and including first and second sections of different sizes, a reset handle extending upwardly from the second section of said body member, a contact blade connected to the first section of said body member, a U-shaped yoke connected to said blade, means including conductors having coiled portions electrically connecting said blade to said plate, a spring member having a portion thereof circumposed on said pin and said spring member having an end portion anchored to said base and its other end engaging said yoke, the first section of said body member being provided with a recess which defines a shoulder, L-shaped support members affixed to said base, a securing element extending between said support members, a trigger bar pivotally mounted on said securing element and said trigger bar including first and second portions which are arranged angularly with respect to each other, the free end of the first portion of the bar adapted to selectively engage the recess and shoulder of the first section of the body member, a projection on the free end of the second portion of the bar, a cable having its lower end fastened in said projection, a stand connected to said base and including an elevated seat, a ball provided with a circular band thereon, and said ball engaging said seat and said cable being connected to said ball, a pair of L-shaped brackets affixed to said base and said brackets including horizontally disposed legs and vertically disposed legs, conductors connected to the horizontal legs of the brackets, a secondary switch assembly on said base and said secondary switch assembly comprising a lower arm provided with a contact on an end thereof, an upper arm having a contact on an end thereof, an insulated bushing on the blade for engaging a portion of the upper arm, and conductors connected to said arm.

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