March 24, 1959 W. H. THOMPSON 2,879,349

SAFETY SWITCH

Filed Oct. 10, 1957 2 Sheets-Sheet 1

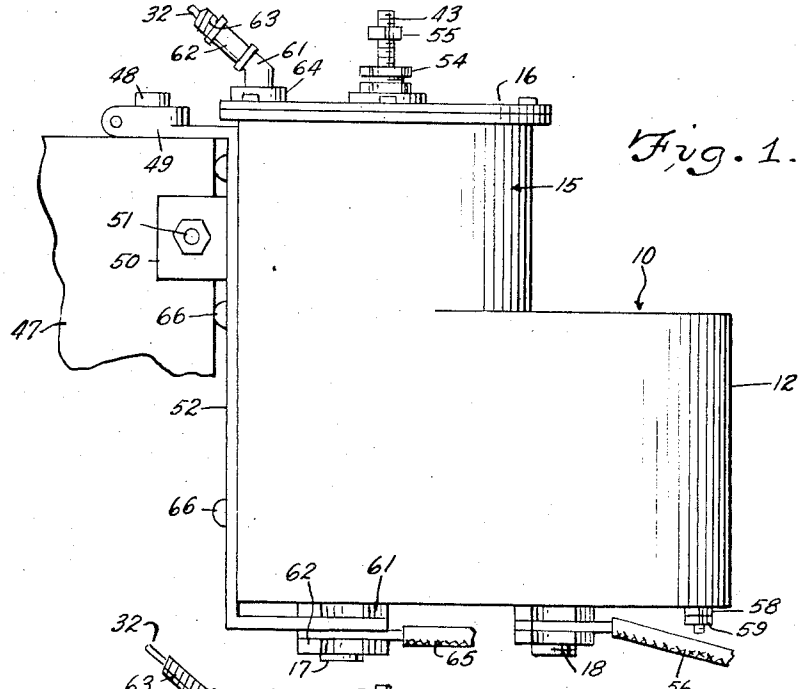

Fig. 1.

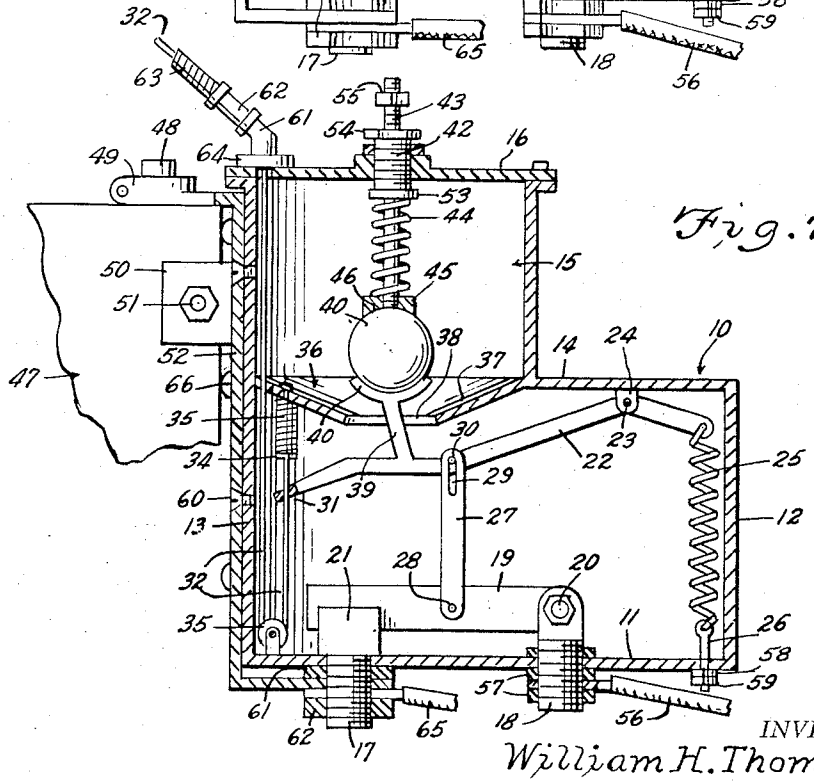

Fig. 2.

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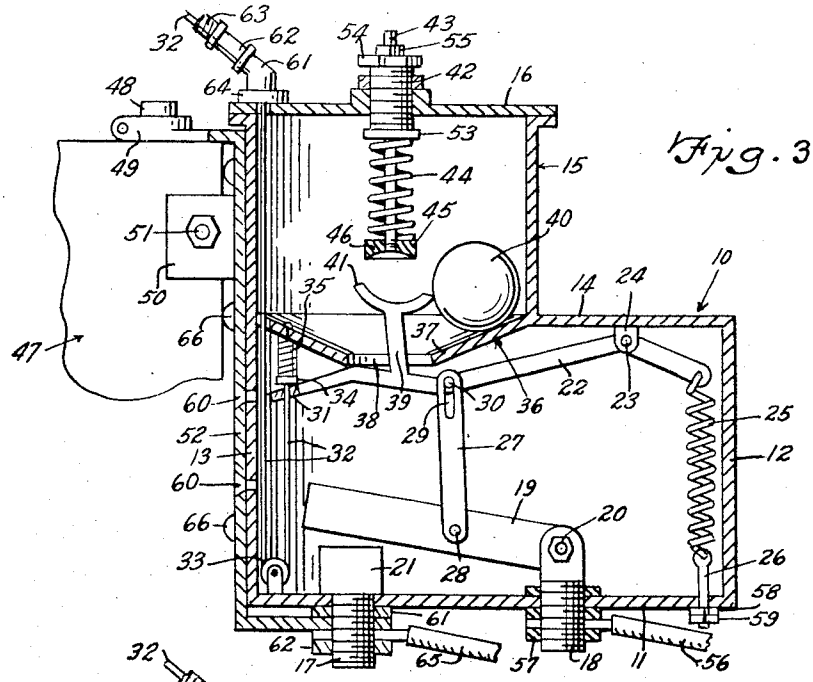

Fig. 3.

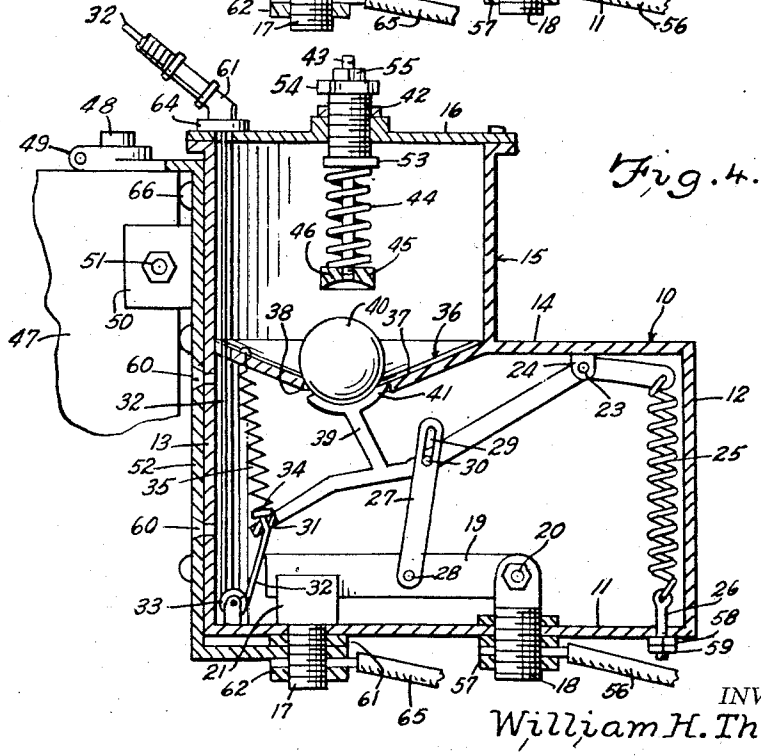

Fig. 4.

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SAFETY SWITCH

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4 Claims. (Cl. 200—61.5)

This invention relates to a safety switch.

The object of the invention is to provide a safety switch which will serve to interrupt or break an electrical circuit in a vehicle, airplane or the like, in the event of an accident or impact whereby the danger of a fire starting after a wreck from gasoline becoming ignited, will be minimized.

Another object of the invention is to provide a safety switch for use with a vehicle ignition system or the like, the safety switch of the present invention including a movable element that is adapted to be moved from a predetermined position upon impact so that an electrical circuit will be interrupted whereby the danger of gasoline being ignited by an electric spark is prevented or minimized, there being a means provided for resetting the switch after it has functioned.

A further object of the invention is to provide a safety switch which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same.

Figure 1 is an elevational view showing the safety switch of the present invention.

Figure 2 is a vertical sectional view taken through the safety switch, and showing the ball and associated parts in one position.

Figure 3 is a view similar to Figure 2, but showing the position of the parts after an impact whereby the electrical circuit is interrupted or broken.

Figure 4 is a view similar to Figures 2 and 3 but showing the parts in a different position, as when the switch is being reset.

Referring in detail to the drawings, the safety switch of the present invention includes a hollow housing which is indicated generally by the numeral **10**, and the housing **10** includes a horizontally disposed bottom wall **11**, upstanding wall members **12** and **13**, an upper flat portion **14**, and an upstanding section or portion **15**. A plate or cover **16** is mounted on the top of the upstanding portion **15**, as for example as shown in Fig. 2.

Extending through the bottom wall **11** of the housing **10** is a pair of terminals **17** and **18**. A blade or contact member **19** has one end pivotally connected to the upper end of the terminal **18** by means of a pivot pin or bolt **20**, and the blade **19** is mounted for movement into and out of engagement with a seat **21** which is arranged on the upper end of the terminal **17**.

Arranged in the housing **10** is a movable arm **22** which has a portion pivotally connected at **23** to a lug **24** which depends from the flat portion **14** of the housing. A coil spring **25** has one end connected to an end of the arm **22**, while the lower end of the coil spring **25** is connected to an eyebolt or securing element **26** which extends upwardly from the bottom wall **11**.

A means is provided for connecting the blade **19** to the

arm **22**, and this means comprises a link **27** which has its lower end connected to the blade **19** by means of a pin or bolt **28**. The upper portion of the link **27** is provided with a slot **29**, and a suitable pin or bolt **30** extends through the slot **29** and into engagement with the arm **22**. A cable or cord **32** extends through an apertured end portion **31** of the arm **22**, and the cable **22** is trained over a pulley **33** which is mounted in the lower portion of the housing. One end of the cable **32** is connected to a stop member **34** on the bottom of a coil spring **35**, and the upper end of the coil spring **35** is connected to a partition **36** which is arranged in the housing.

The partition **36** is provided with a downwardly recessed portion **37** which has a central opening **38** therein, and a finger **39** extends upwardly from the arm **22** and projects through the opening **38**. A cradle or seat **41** is arranged on the upper end of the finger **39**, and a ball **40** is adapted to be seated in the cradle **41**.

Extending through the plate **16** is a bushing **42**, there being a rod **43** projecting through the bushing **42**. A coil spring **44** is circumposed on the rod **43**, and the bottom of the coil spring **44** abuts the cap **45** which has a lower recess portion **46** for engagement with a portion of the ball **40**.

The numeral **47** indicates a portion of a conventional battery such as a vehicle storage battery, and the battery **47** includes the usual terminal post **48**. A conductor **52** has a portion **49** arranged in engagement with the terminal post **48** of the battery **47**, and the conductor **52** leads to the terminal **17**. A clamping means is provided for connecting the housing **10** to the battery **47**, and this means comprises one or more lugs **50** which extend from the housing **10** and may be secured to the battery **47** by means of bolt and nut assemblies **51**.

From the foregoing, it is apparent that there has been provided a safety switch which is especially suitable for ues on vehicles such as automobiles, trucks, buses or the like, wherein in the event of an accident, wreck, or impact of sufficient momentum, the ball will be dislodged from its seat or cradle **41** whereby the parts will move from the position shown in Fig. 2 to the position shown in Fig. 3 so that the electrical circuit will be interrupted whereby there will be no danger of gasoline being ignited by the electric spark or current. The safety switch of the present invention serves to disconnect the generator and battery of an automobile, airplane, or the like whether the impact occurs at the front, back, or sides, or whether the vehicle rolls over, and the safety switch will prevent fires from starting after a wreck, since no spark can ignite the spilled gasoline. The metal ball **40** is adapted to be knocked out of the cradle **41** on the finger **39** and when the ball **40** moves from the position, shown in Fig. 2, to the position shown in Fig. 3, upon impact, the arm **22** will be moved or pivoted from the position shown in Fig. 2 to the position shown in Fig. 3 by means of the coil spring **25**. The switch can be set to operate for heavy or light impacts, by adjusting various nuts. The arm **22** is adapted to pull the knife switch **19** from the contact **21** when the ball **40** is knocked off of the cradle **41** after an accident. The cap **45** has the recessed portion **46** which engages the top of the ball **40**, and the rod **43** is adjustable and has a coil spring **44** thereon. The cap **53** is arranged above the coil spring **44**. The nut **54** is arranged on the upper end of the sleeve **42** whereby the sleeve **42** can be turned when it is being adjusted, and a lock nut **55** is arranged above the nut **54**. The parts can be made of any suitable material and in different shapes or sizes, as for example the housing **10** can be made of plastic. The conductor **52** leads from the terminal post **48** to the terminal **17**, and a cable **56** leads from the terminal **18** to the starter post of the vehicle. Lock nuts **57** are arranged in threaded en-

gagement with the lower portion of the terminal 18. The member 19 constitutes a knife switch blade. The seat 21 is adapted to be lined with lead, and the link 27 moves the blade 19 when the arm 22 moves. The pulley 33 has the cable 32 trained thereover. The housing 10 is connected to the battery 47 by means of the clamp 50. The housing 10 may be made in sections and such sections may be connected together in any suitable manner. Tension on the coil spring 25 can be adjusted by means of the nut 58, and a lock nut 59 which is arranged adjacent to the nut 58. The securing element 26 is in the nature of an eyebolt. Countersunk screws 60 are provided for connecting the conductor 52 to the housing 10. A holding nut 61 and a lock nut 62 are also arranged on the terminal 17. The screw or bolt 51 can be used for fastening the housing 10 to the battery 47 so as to maintain the housing securely connected to the battery. A flanged pipe 61 is provided whereby the resetting cable 32 can be hooked to the vehicle instrument panel, from any direction. A suitable wire may be connected to the cable 32, and such a wire may lead to the instrument panel for use when the switch is to be reset. The resetting mechanism may include a set screw 62 and a wire sleeve 63, and the spring 35 serves to keep the flexible cable 32 tight, the numeral 34 indicating a connection between the cable 32 and spring 35. A swivel plate 64 may be arranged above the cover 16. The numeral 65 indicates the wire which leads to the generator. Buffer knobs 66 serve to properly space the housing 10 from the battery 47 so as to provide sufficient clearance for the terminal or conductor 52.

The parts may be lined with lead so as to prevent corrosion and to prevent damage from arcing.

From the foregoing, it is apparent that there has been provided a safety switch for use with vehicles, such as automobiles or the like. In use, the safety switch is adapted to be arranged in the electrical circuit of the vehicle and normally the parts are in the position shown in Fig. 2 so that the current can flow through the switch blade 19 between the terminals 17 and 18 whereby the vehicle can be used in the usual manner. However, in the event of an accident, the impact will cause the ball 40 to be knocked off of the cradle 41 so that the ball 40 will move from the position shown in Fig. 2 for example to the position shown in Fig. 3. With the ball 40 off of the cradle 41, the spring 25 will pivot the arm 22 about the pivot pin 23 so that the link 27 will be moved upwardly. Since the link 27 is connected to the switch blade 19, it will be seen that the upward movement of the link 27 will cause pivotal movement of the switch blade 19 about an axis extending through the pin or bolt 20 so that the switch blade 19 will move out of engagement with the seat 21 whereby the electrical circuit will be interrupted. The cap 45 serves to normally exert sufficient pressure on the ball 40 so as to prevent accidental dislodgment of the ball 40 from its cradle, but when sufficient impact occurs, then the resistance of the cap 45 can be overcome and the ball 40 can move off of the cradle.

To reset the switch, it is only necessary to pull on the cable 32, and the cable 32 may be connected to a suitable knob or the like on the instrumental panel of the vehicle. By pulling on the cable 32, the parts can be pivoted or moved from the position shown in Fig. 3 to the position shown in Fig. 4, and it will be seen that in Fig. 4 the cradle 41 moves down below the opening 38 in the platform 36. Then, the ball 40 will roll down the inclined surface 37 and be received on the cradle 41. When pressure is released on the cable 32, the coil spring 25 will move the parts from the position shown in Fig. 4 the cradle 41 moves down belowt he opening 38 in the cal circuit is again completed whereby the vehicle can be used in the usual manner.

While I have shown a preferred form of my invention, I reserve all rights to such modifications as properly fall within the scope of the invention as claimed.

I claim:

1. In a safety switch, a hollow housing including a horizontally disposed bottom wall, said housing further including upstanding wall members, a horizontally disposed upper flat portion and an upstanding portion, a plate mounted on the upstanding portion of said housing, first and second spaced apart terminals extending through said bottom wall into said housing, conductor wires connected to said terminals, a conductor leading from said first terminal to a battery terminal post, a seat on the upper end of said first terminal, a blade pivotally connected to said second terminal and mounted for movement into and out of engagement with said seat, an arm movably mounted in said housing and having a portion pivotally connected to the flat portion of said housing, a securing element extending upwardly from the bottom wall of the housing, a coil spring having one end connected to said securing element and its other end connected to an end of said arm, a link having its upper end connected to said arm and its lower end connected to said blade, a partition arranged in said housing and including a downwardly recessed portion provided with a central opening, a finger extending upwardly from said arm and projecting through said opening, a cradle on the upper end of said finger, a ball seated in said cradle, a bushing mounted in the plate on top of said housing, a rod extending through said bushing, a recessed cap on the lower end of said rod for engagement with said ball, a coil spring arranged in engagement with said rod and abutting said cap, a pulley mounted in the lower portion of the housing, a cable trained over said pulley and extending through an end of said arm, and a coil spring having one end connected to said cable and its other end connected to said partition.

2. The structure as defined in claim 1, wherein said cable is adapted to be actuated when the switch is to be reset.

3. The structure as defined in claim 1, and further including clamps for securing said housing to a battery.

4. In a safety switch, a hollow housing including a bottom wall, a plate mounted on said housing, first and second spaced apart terminals extending through said bottom wall and into said housing, conductors connected to said terminals, a seat on the upper end of said first terminal, a blade pivotally connected to said second terminal and mounted for movement into and out of engagement with said seat, an arm movably mounted in said housing and having a portion pivotally connected to said housing, a securing element extending upwardly from the bottom wall of the housing, a coil spring having one end connected to said securing element and its other end connected to an end of said arm, a link having its upper end connected to said arm and its lower end connected to said blade, a partition arranged in said housing and including a downwardly recessed portion provided with a central opening, a finger extending from said arm and projecting through said opening, a cradle on the upper end of said finger, a ball seated in said cradle, a bushing mounted in the plate on said housing, a rod extending through said bushing, a reset cap on the lower end of said rod for engagement with said ball, a coil spring arranged on said rod and abutting said cap, a pulley mounted in the lower portion of the housing, a cable trained over said pulley and extending through an end of said arm, and a coil spring having one end connected to said cable and its other end connected to said partition.

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