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SAFETY CIRCUIT BREAKER

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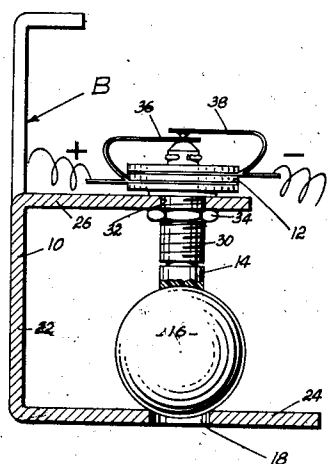


FIG. 1

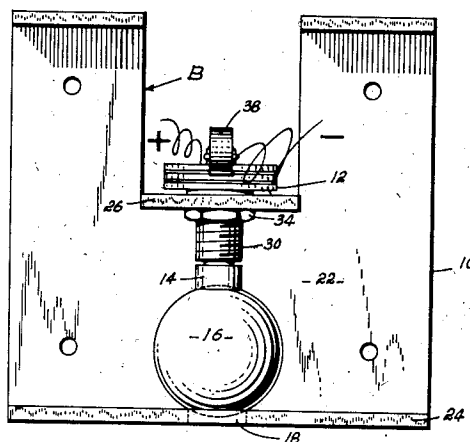


FIG. 3

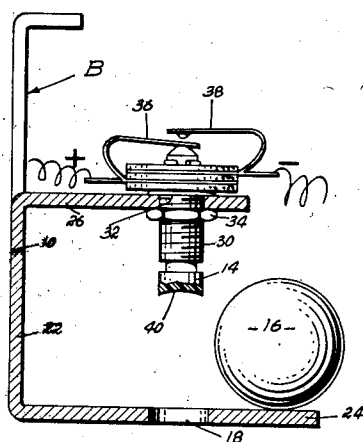


FIG. 2

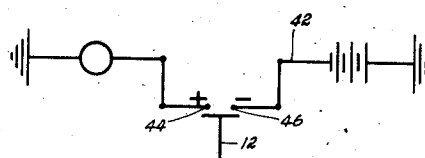


FIG. 4

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1

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SAFETY CIRCUIT BREAKER

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3 Claims. (Cl. 200—61.45)

The present invention relates generally to automotive vehicles and more particularly to a new and novel safety circuit breaker for automatically interrupting the electrical circuit of an automotive vehicle in the event of a collision, upset or other abnormal condition.

It is a major object of the present invention to provide a safety circuit breaker which is adapted to interrupt the electrical circuit of the automotive vehicle regardless of the point of impact upon the vehicle so as to avoid the danger of fire due to a collision or upset with the subsequent spillage of gasoline and oil.

Another object of the invention is to provide a safety circuit breaker of the afordescribed nature which is simple in design, rugged of construction and fool-proof in operation.

A more particular object of the invention is to provide a safety circuit breaker of the afordescribed nature which will only operate to interrupt the vehicle's electrical circuit when it is exposed to a major impact.

Yet a further object of the present invention is to provide a safety circuit breaker of the afordescribed nature which will be inexpensive to manufacture and hence may be sold at low cost to a wide market.

These and other objects and advantages of the invention will become apparent from the following detailed description, when taken in conjunction with the appended drawings, wherein:

Figure 1 is a side elevational view taken partly in section of a preferred form of safety circuit breaker embodying the present invention and showing the parts thereof disposed in their normal position;

Figure 2 is a view similar to Figure 1 but showing the parts of said safety circuit breaker after an impact;

Figure 3 is a front elevational view of said safety circuit breaker; and

Figure 4 is a diagrammatic illustration showing how said safety circuit breaker is installed in an automotive vehicle's electrical circuit.

Referring to the drawings, the preferred form of safety circuit breaker B embodying the present invention includes a rigid bracket 10 and an electric switch 12 secured to the bracket 10 and adapted to be interposed in the automotive vehicle's electrical circuit. The electric switch 12 includes a reciprocally mounted plunger 14 that is constantly biased towards an extended position, said switch being closed when the plunger is compressed and opened when the plunger is extended. A ball 16 is interposed between the bracket 10 and the plunger 14 for normally maintaining the plunger compressed. The bracket 10 is formed with a seat 18 for the ball 16. With this arrangement, the ball 16 will normally be disposed in its position of Figure 1 at which time the plunger 14 will be compressed and hence the switch 12 will be closed. Referring now to Figure 2, in the event the automotive vehicle is subjected to a major impact by reason of a collision or upset the ball 16 will move out from between its seat 18 and the plunger 14. Accordingly, the plunger 14 will snap to its extended position and the switch 12

2

will then be opened. In this manner the automotive vehicle's electric circuit will be automatically broken.

More particularly, the bracket 10 is generally L-shaped having a vertical wall 22 and a horizontal base 24. A horizontal arm 26 extends from the vertical wall 22 in overlying relation parallel to the base 24. Preferably, this horizontal arm 26 will be stamped from the material of the vertical wall 22. The vertical wall 22 is adapted to be rigidly secured at a desirable point either beneath the instrument panel or beneath the hood of the vehicle. The bracket may be incased within a suitable housing (not shown) if desired. The switch 12 will preferably be of the micro-switch type of any well known construction. It is shown as having a threaded sleeve 30 which may be retained within a bore 32 formed in the horizontal arm 26 by means of a nut 34. The switch 12 includes a pair of U-shaped spring arms 36 and 38 which, as indicated in Figure 1, each have a lower supporting end fixed to the upper end of sleeve 32 and are insulated therefrom and from each other, while the upper contact ends of said arms overlap in vertically spaced relationship when the switch is open. The switch is closed by the lower of said contact ends being moved into engagement with the upper contact end by the upper end of the plunger 14 engaging the lower contact end to elevate it when said plunger is moved to elevated position by ball 16 being mounted in operative position in seat 18.

Referring now to Figure 2 the plunger is constantly biased towards its extended position by spring means (not shown) disposed within the sleeve 30. When the plunger moves to its extended position, the spring arm 36 moves downwardly away from the other spring arm 38.

The ball 16 will preferably be formed of metal and may conveniently consist of a conventional ball bearing. The seat 18 may consist of a bore formed in the base 24 of the bracket 10. Preferably, the lower end of the plunger 14 will be formed with a spherically shaped recess 40 for receiving the upper end portion of the ball 16. As will be seen from Figs. 1 and 3 particularly, the diameter of seat 18 is approximately half that of the ball 16 and the diameter of the lower end of plunger 14 is greater than that of the part which is slidable in sleeve 30 and is nearly as great as the diameter of seat 18. Also, the curvature of recess 40 preferably is complementary to that of ball 16, whereby said ball is firmly held by recess 40 against seat 18 to resist normal jarring motions of the vehicle but sudden relatively violent impacts will dislodge the ball.

Referring to Figure 4, in order to install the afordescribed automatic circuit breaker, a main conductor 42 from the automotive vehicle's source of electrical energy is cut and its severed ends connected to the terminals 44 and 46 of the switch 12. When the ball 16 is inserted between its seat 18 and the lower end of the plunger 14, the circuit through the main conductor 42 will be completed. Should the vehicle be suddenly stopped or upset as by collision or engagement with a relatively immovable object, the ball will be urged out of the seat and the plunger will snap into its extended position so as to break the circuit through the main conductor 42. In this manner, the flow of electrical current through the vehicle's equipment will be interrupted so as to avoid any danger of fire caused by a short circuit in the presence of spilled gasoline or oil. It will be apparent that the automatic circuit breaker may be readily re-set by reinserting the ball 16 between its seat 18 and the lower end of the plunger 14.

It will be apparent from the foregoing description that an extremely simple and effective means has been provided to automatically interrupt the flow of electrical current in the event of a collision or upset by an automotive vehicle. The parts of the safety circuit breaker are few

3

and simple and the device is extremely rugged. It will not act to interrupt the automotive vehicle's flow of electrical current upon minor impacts of the automobile but instead requires a major impact for operation. This safety circuit breaker may be inexpensively manufactured whereby it can be sold at a low cost to a wide market.

While there has been shown and described hereinbefore what is presently considered to be the preferred embodiment of the present invention, it will be apparent that various modifications and changes may be made thereto without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. A safety circuit breaker for automatically interrupting an electric circuit in a vehicle upon an impact, comprising: an L-shaped bracket affixable to said vehicle, said bracket having a vertical wall and a horizontal base; a horizontal arm extending from said vertical wall in overlying parallel relation to said base; a switch secured to said arm and interposed in said circuit, said switch comprising a vertical sleeve fixedly extending through said horizontal arm, a plunger reciprocally supported within said sleeve and constantly biased in extended position downwardly, spring arms each connected at one end to the upper end of said sleeve and insulated from each other and the other ends of said arms being contact ends axially aligned with said plunger and separated vertically from each other when said switch is open, the upper end of said plunger when elevated engaging the lowermost contact end of said spring arms and holding it in contact

4

with the uppermost contact end to close said switch; a ball interposed between said base and the lower end of said plunger for normally maintaining said plunger elevated so as to close said switch and complete said circuit; and a seat for said ball formed in said base in alignment with said plunger, said ball having sufficient mass as to be movable out of said seat upon a sudden impact to the vehicle whereby said plunger will be extended and said circuit will be automatically broken.

2. A safety circuit breaker as set forth in claim 1 wherein said seat comprises a circular hole in said base having a diameter approximately half the diameter of said ball and the lower end of said plunger has a diameter nearly as great as said hole and is formed with a spherical recess complementary in curvature to hold said ball against said seat firmly to resist normal jarring motions of said vehicle but not sudden impact.

3. A safety circuit breaker as set forth in claim 1 wherein said arm is stamped and bent from said vertical wall, and the space between said base and arm is open to permit ready mounting of said ball between said seat and plunger.

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