

Feb. 7, 1956

C. J. RAYNOR
EMERGENCY SWITCH

2,734,103

Filed March 9, 1953

2 Sheets-Sheet 1

Fig. 1

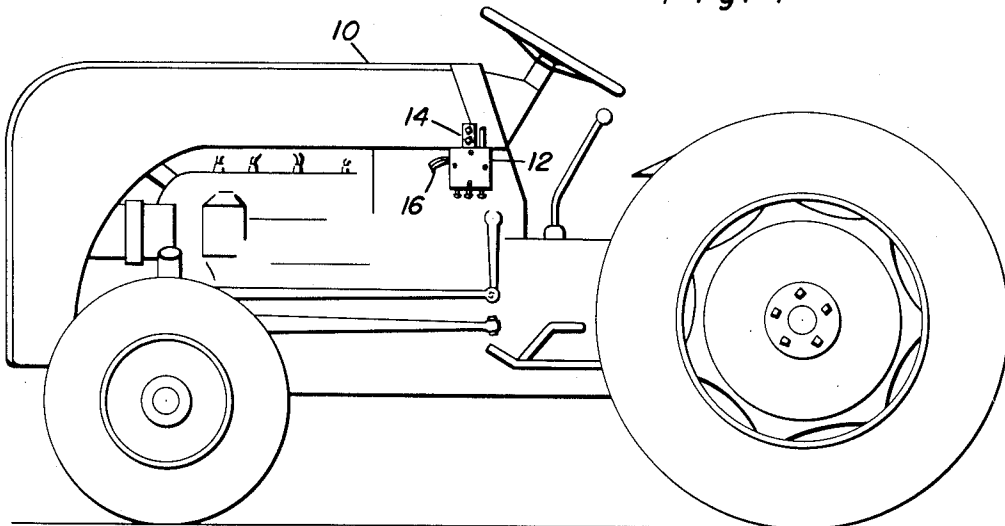


Fig. 2

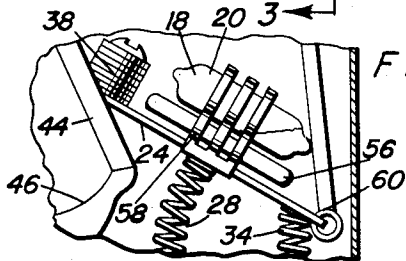
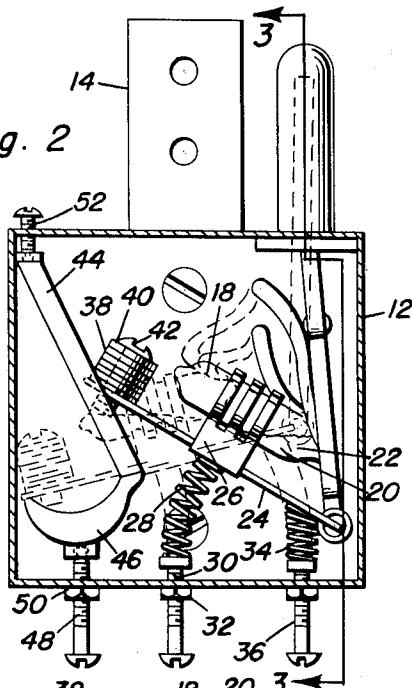
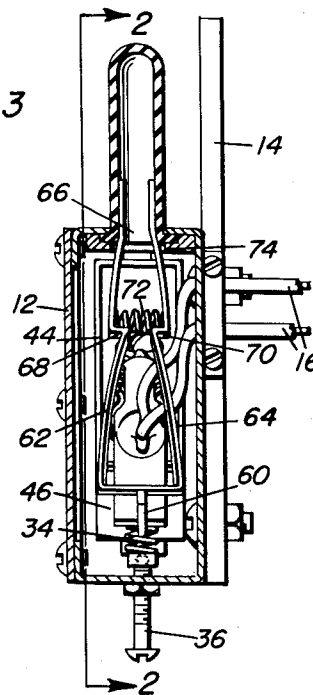


Fig. 4

Fig. 3



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2 Sheets-Sheet 2

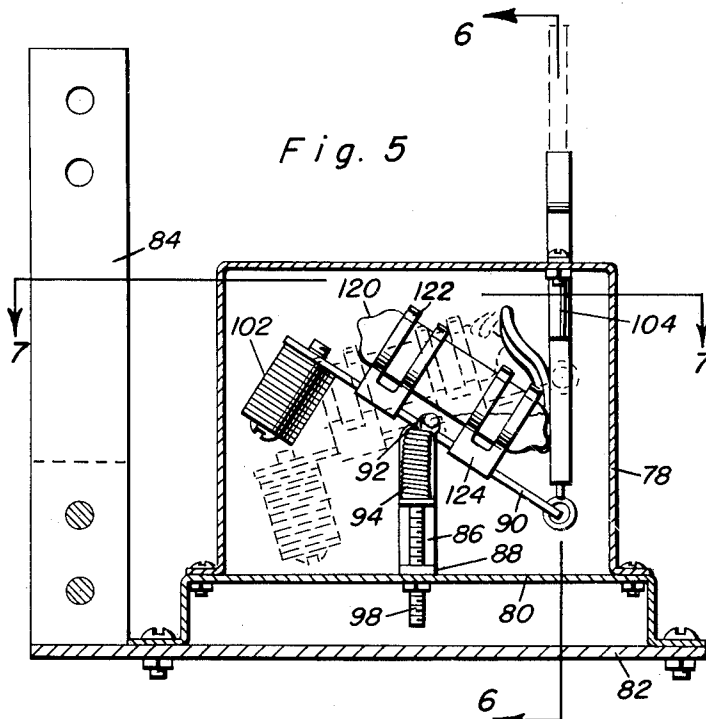


Fig. 5

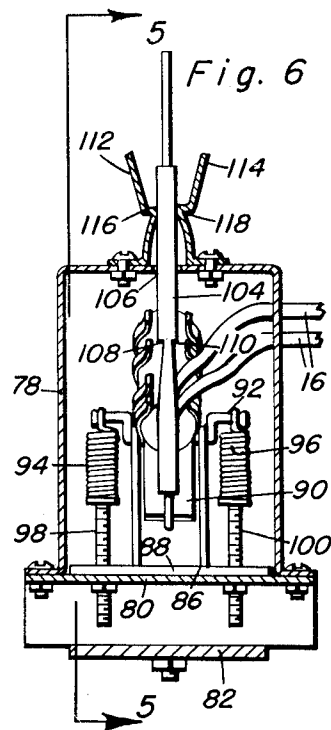


Fig. 6

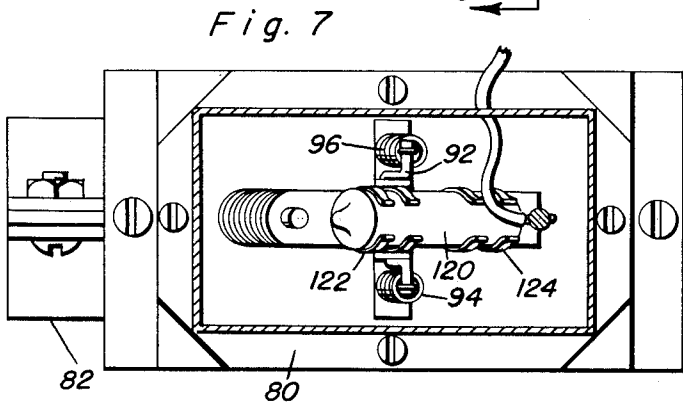


Fig. 7

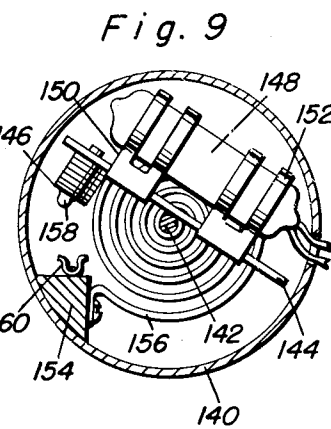


Fig. 9

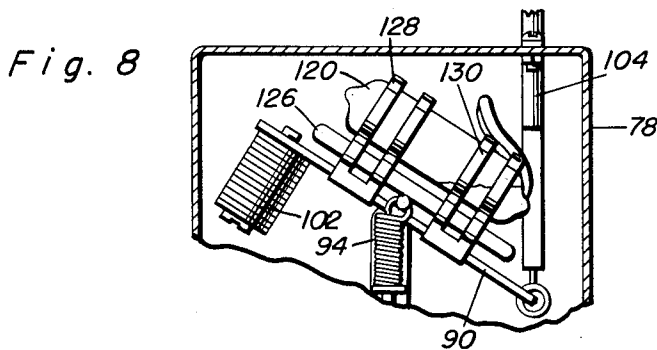


Fig. 8

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2,734,103

EMERGENCY SWITCH

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3 Claims. (Cl. 200—61.5)

This invention relates to an emergency switch and particularly to an inertia operated switch for disconnecting an electric circuit in response to a too rapid deceleration of a vehicle.

In the operation of motor vehicles such as tractors, trucks, automobiles, aircraft and the like, it frequently happens that the vehicle collides with something or is brought to a certain stop under emergency conditions so that it is desirable to disconnect the energy from the electric battery so there will be no danger of an electric spark igniting gasoline or other combustible material about the vehicle.

The present invention provides an inertia operated switch having a switch plate mounted for oscillation or rotation about a pivot point in a housing and a position switch such as a mercury switch carried thereby with means to bias the switch to on position for a normal operation but having a weight or other inertia operated means for moving the switch to off position in response to too rapid deceleration. Any suitable means such as a spring detent, a magnetic catch or an overbalanced biasing means may be utilized to retain the switch in off position until it is manually reset.

It is accordingly an object of the invention to provide an inertia operated switch.

It is a further object of the invention to provide an inertia operated switch which will remain locked in off position until reset.

It is a further object of the invention to provide an automatic detent for retaining a position switch in off position.

Other objects and many of the attendant advantages of the present invention will be apparent from the following detailed description taken in conjunction with the accompanying drawing, in which:

Figure 1 is an elevation of a motor vehicle with the safety switch installed;

Figure 2 is a sectional elevation of the switch taken substantially on the plane indicated by the line 2—2 of Figure 3;

Figure 3 is a vertical sectional view taken substantially on the plane indicated by the line 3—3 of Figure 2;

Figure 4 is a fragmentary detail showing the use of a counterpoise in the switch;

Figure 5 is a sectional elevational view of the snap acting switch taken substantially on the plane indicated by the line 5—5 of Figure 6;

Figure 6 is a sectional elevation of the switch taken substantially on the plane indicated by the line 6—6 of Figure 5;

Figure 7 is a cross section through the switch taken substantially on the plane indicated by the line 7—7 of Figure 5;

Figure 8 is a fragmentary view showing a further modification according to the invention; and

Figure 9 is a sectional elevation of a further modification.

In the exemplary embodiment according to the inven-

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tion a vehicle 10 is provided with a safety switch comprising a housing 12 mounted to the frame of the vehicle by means of a bracket 14. Conductors 16 of a conventional electrical circuit are introduced into the housing 12 for connection to a switch 18 of a position type and which preferably includes a substantially elongated insulating tube 20 having a quantity of mercury 22 therein for bridging the terminals of the conductor when introduced into the casing 20 as is well known. The switch 18 is mounted on a switch base 24 by means of a resilient mounting bracket 26. The base 24 is mounted for pivotal movement on the top of a spring 28 which is attached substantially centrally of the base 24 and has its other end attached to an adjusting screw 30 having a lock nut 32 for retaining the screw 30 in desired position. A biasing spring 34 is attached to one end of the base 24 and has a tension screw 36 attached thereto. The tension of the spring 34 is sufficient to tilt the base 24 so that the switch 18 is in the on position with the mercury 22 closing the conductor 16 as is well known. An inertia member 38 includes a plurality of iron washers 40 secured to the end of the base 24 by any suitable means such as the screw 42. The end of the base 24 carrying the inertia member 38 extends into a guide track 44 which may be adjustably mounted in the housing 12. A magnetic member 46 is mounted in the housing 12 in the path of movement of the base 24 and is preferably of such strength that when the washers 40 are brought into contact with the magnetic member 46 they will be substantially held thereagainst. An adjusting screw 48 having a lock nut 50 may be utilized to adjust the magnetic member 46 vertically of the housing 12 and a set-screw 52 may be utilized to control the guide track 44 and to stabilize the magnetic member 46. A counter-balance or distributed weight 56 may be mounted between the switch 18 and the base 24 by means of a suitable bracket 58. The distributed weight 56 stabilizes the switch member so that the inertia member 38 will not be likely to operate the switch in response to local stimuli.

In addition to or in place of the magnetic detent 46 a spring detent 60 having a pair of arms 62 and 64 is pivotally connected to one end of the base 24 and extends up through an aperture 66 in the housing 12. The arms 62 and 64 are provided intermediate their length with offset portions 68 and 70 and a spring 72 is mounted between the arms 62 and 64 to separate them. The aperture 66 is of such dimensions that the arms 62 and 64 may be compressed to pass therethrough so that the offset portions 68 and 70 will engage with the edge 74 thereof. The spring 72 will expand the edges 68 and 70 over the edge 74 so that the arms 62 and 64 will hold the base 24 in elevated position to maintain the switch 18 in open position.

The modification according to Figures 5, 6, 7 and 8, a housing 78 is provided with a base 80 which is in turn mounted on a bracket 82 having an arm 84 for connection to the vehicle. A post or standard 86 has a base 88 mounted in the central portion of the housing 78 and extending upwardly therein. A switch base 90 is provided with a transverse axle 92 which is mounted in suitable recesses in the tops of the post 86. The outer ends of the shaft 92 are extended upwardly to provide studs extending outwardly from the base 90 and springs 94 and 96 are attached to the upwardly extending studs and are connected to the base 80 by means of suitable tension screws 98 and 100. An inertia member 102 is attached to one end of the base 90 and a reset stem 104 is attached to the outer end of the base 90. The stem 104 extending outwardly through an aperture 106 in the casing 78 and being provided intermediate the ends thereof with recess notches 108 and 110. Resilient detents 112 and 114 are

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mounted on the outside of the casing 78 and have offset detent portions 116 and 118. When the stem 104 is pushed outwardly by account of the shifting of the switch base 90 the stem 104 will move outwardly so that detents 116 and 118 will be caught in the grooves 108 and 110 and retain the switch 120 mounted on the base 90 by means of brackets 122 and 124 in inoperative position. Obviously the device may be reset by opening the members 112 and 114 and pushing down on the stem 104.

Again a distributed weight 126 may be mounted longitudinally of the base 90 by means of suitable brackets 128 and 130.

A simplified embodiment of the invention comprises a substantially circular casing 140 having an axle 142 journaled therein. A switch base 144 is fixed on the axle 142 and is provided with an inertia member 146. A position switch 148 is mounted on the base 144 by means of brackets 150 and 152. An anchor member 154 is mounted in the housing 140 and a spiral spring 156 is connected to the anchor member 154 and the axle 142 and serves to bias the switch 148 to normally closed position. A ball shaped detent 158 is mounted on the lower end of the inertia member 146 and a spring clip 160 is mounted on the stop 154 so that when sudden stoppage of the vehicle causes rotation of the shaft 142 the detent 158 will be received in the spring clip 160 to hold the switch 148 in inoperative position.

In operation of the safety switch according to the invention the switch will be manually set to closed position by means of the stem 60 and 104 where it will be retained by means of the spring 34 or because of the over center action in the operation of the springs 94 and 96 or the spring 156. In the event the vehicle is brought to a sudden stop or at least to a stop faster than that which can be secured by a normal braking mechanism inertia members will cause rotation of the switch elements to disconnect the electrical circuits and cause a stoppage of the vehicle. The spring detents will hold the switch in off position until again manually reset. It will thus be seen that the present invention will provide a system for disconnecting the electrical system thus preventing fires or other accidents in the event of a collision.

While for purposes of exemplification particular embodiments of the invention have been shown and de-

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scribed according to the best present understanding thereof it will be apparent to those skilled in the art that many changes may be made in the construction and arrangement of parts thereof without departing from the true spirit and purpose of the invention.

What is claimed as new is as follows:

1. An inertia operated safety switch comprising a housing, a mounting post in said housing, a switch base journaled on said post, a position switch mounted on said base, an inertia member mounted on said base, a stud on said base, said stud being arranged at a point perpendicular to said base at said journal, a tension spring mounted on said stud and secured to said housing at a point transverse to said mounting post.

2. A inertia operated safety switch comprising a housing, a mounting post in said housing, a switch base journaled on said post, a position switch mounted on said base, an inertia member mounted on said base, a stud on said base, said stud being arranged at a point perpendicular to said base at said journal, a tension spring mounted on said stud and secured to said housing at a point transverse to said mounting post, a distributed weight member mounted on said base.

3. A inertia operated safety switch comprising a housing, a switch base journaled in said housing substantially centrally thereof, a mercury switch mounted on said switch base, spring means biasing said switch to closed position, an inertia member mounted on said base, a resilient detent pivotally mounted on said base, said housing having an aperture, said detent extending through said aperture and being operative to retain said switch when said switch is moved to open position, manual release means for said detent, and a flexible covering mounted about said aperture and receiving said detent.

References Cited in the file of this patent

UNITED STATES PATENTS

1,902,371	Miller et al. -----	Mar. 21, 1933
2,280,114	Athy -----	Apr. 21, 1942
2,539,736	Fraser -----	Jan. 30, 1951

FOREIGN PATENTS

446,230	Great Britain -----	Apr. 27, 1936
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