June 27, 1933. R. C. BIGELOW 1,915,267

SHORT CIRCUITING SWITCH

Filed Dec. 8, 1930

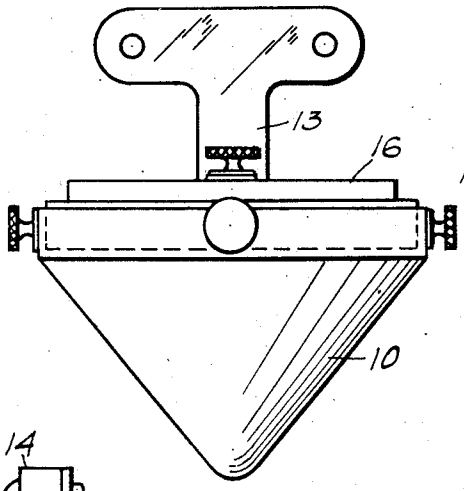



Fig. 1.

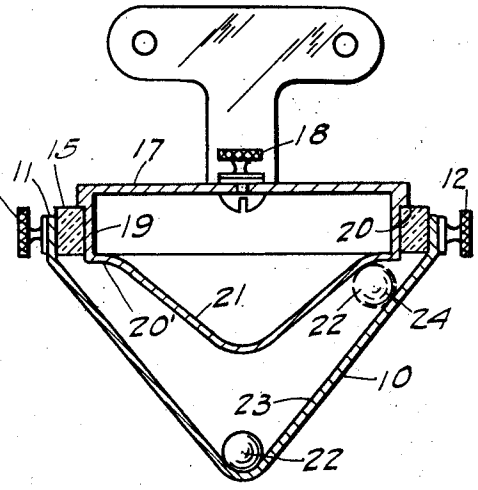



Fig. 4.

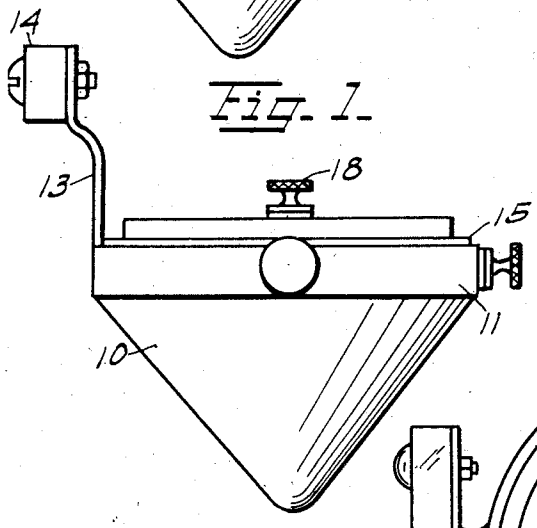



Fig. 2.

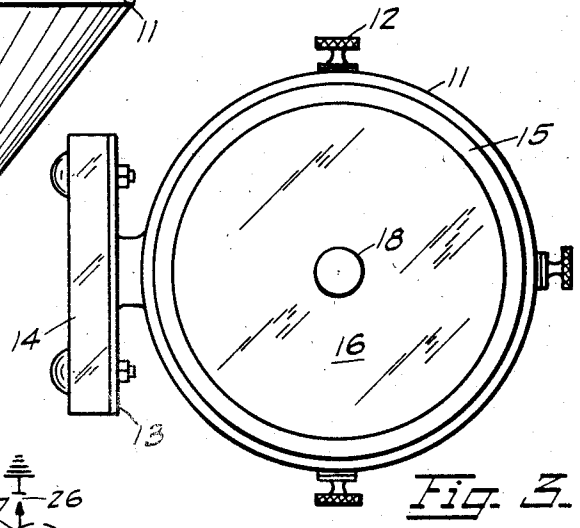



Fig. 3.

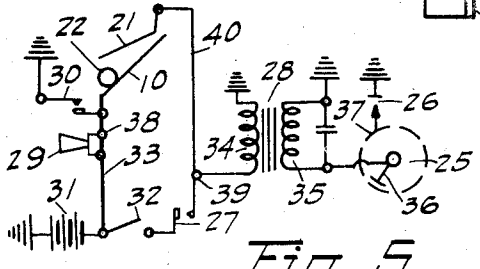



Fig. 5.

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# UNITED STATES PATENT OFFICE

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## SHORT CIRCUITING SWITCH

Application filed December 8, 1930. Serial No. 500,817.

This invention is for a short circuiting switch, and has special reference to an electrical switch which is actuated by tilting of a member to which it is attached and is especially applicable to the ignition system of automotive vehicles and motor boats.

The main object of the invention is to provide a switch which will interrupt the high tension ignition circuit of an automotive vehicle in the event of dangerous tilting or turning over of such vehicle.

Another object of the invention is to provide a device as outlined which may be included in the horn or audible signal circuit so as to cause such signal to operate continuously in the event of turning over of the vehicle.

A further object of the invention is to provide a device as outlined which will operate irrespective of the direction in which it is tilted, being universally operative.

Other objects and advantages of the invention will be readily apparent as the description is read on the drawing forming a part of this specification.

The invention consists primarily of an inverted conical shell of conductive material, the base of the cone terminating at and continuing into a cylindrical collar, into which is secured a ring of insulating material A cylindrical member of conductive material fits within the ring and has a bottom of conical form of greater angularity than said conical shell. Terminal connectors are in electrical contact respectively with the cylindrical member and cylindrical collar, and a conductive ball is freely disposed in the apex of the conical shell. A mounting bracket is integral with or fixed to the cylindrical collar.

The invention is adequately illustrated in the accompanying drawing in which:

Fig. 1 is a front elevation;

Fig. 2 is a side elevation;

Fig. 3 is a top plan view of the invention;

Fig. 4 is a sectional elevation showing the interior construction and cooperative relation of the parts;

Fig. 5 is a wiring diagram applied to the invention.

Similar reference characters are used to designate similar parts throughout the several views.

A conical shell 10 is formed by drawing, spinning or turning a conductive material, continuing the base of the cone into a cylindrical collar 11, onto which is connected one or more terminal binding posts 12. A mounting bracket 13 of suitable form is provided for attachment to a part of the vehicle, an insulating block 14 being provided where the device is attached to metal portions of the vehicle.

A ring 15 formed of insulating material is secured within the cylindrical collar 11 and provides a seat for the cooperating switch member 16, which has a cover portion 17 to which is connected a terminal binding post 18, and a cylindrical portion 19 having a shoulder 20 for seating on the insulating collar 15. The bottom is toroidally formed at 20′ extending into a conical depending portion 21 having a greater included angle than member 10.

The toroidal portion provides a ball raceway which will retain a ball in bridging contact between the cooperating contact members during any rolling action of the switch other than in a direction toward righting thereof.

A contact ball 22 of conductive material is adapted to roll along the inner surface 23 of member 19 to the position shown at 24 when the vehicle is tilted at an angle making contact between the inside of wall 23 and arcuate portion 20 through ball 22.

The wiring diagram Fig. 5 indicates an operative method of connecting the device in the electrical circuit for interrupting the ignition and operating the audible signal or horn in the event of turning over of the vehicle. The main advantage exists in the fact that in the event of accident, such as a vehicle plunging over a bank, or leaving the roadway and turning over in a heavy fog, the accident might not be known or noticed and continued running of the engine might readily cause the car to take fire, while with the invention installed, a continuous loud signal emitted by the horn would attract attention of any within the audible limit,

while interruption of the motor ignition circuit would instantly stop the motor.

The wiring diagram may be modified without detracting from the merit of the device, but is indicated in its simplest operative form, and consists of the usual distributor 25, spark plugs 26, breaker 27, ignition coil 28, horn 29, horn push button 30 and battery 31, together with the usual wire connections and ignition switch 32, all of which does not form a part of the invention but is the usual standard ignition equipment. The device does not interfere with the usual and regular operation of the horn and motor which are hooked up in individual circuits, the horn being operated by closing of the switch or operation of the push button 30 which completes a circuit from battery 31 through wire 33, horn 29, switch 30 to ground.

The motor circuit is from battery 31, ignition switch 32, breaker 27, primary 34 of ignition coil 28 to ground by the interruption of which through breaker 27 a high potential is set up in the secondary 35 which passes to the distributor arm 36, to shoes 37 thence to spark plugs 26 and across the gap to ground.

No changes are made in the existing wiring with my invention simply requiring a connection from the negative terminal 38 of horn 28 to cone 10 through one of the terminals 12, and another connection from the negative side 39 of the ignition switch 27 to member 16 through binding post 18.

In the event of dangerous tilting of the vehicle, ball 22 rolls along surface 10 to the position shown at 24 completing a circuit from member 10 to member 21. A circuit is thus completed through battery 31, wire 33, horn 29, member 10, ball 22, member 21, wire 40, primary 34, to ground, coincidently shorting the breaker 27 through switch 32, wire 33, horn 38, member 10, ball 22, member 21, wire 40. If the horn is operated by an electro-magnet with interrupter, a flux will be set up in secondary 35, but there will be a rapid succession of sparks across the spark plugs in succession, and as there will be extreme pre-ignition, the motor will be stalled, as it is impossible for a motor to operate under such conditions, and the breaker 27 will not be effective.

Having described the construction and operation of the device, it will be understood that variations in construction and arrangement of parts which are consistent with the appended claims may be resorted to without detracting from the spirit or scope of the invention or sacrificing any of its advantages.

I claim:

1. A gravitationally operated switch comprising a housing of conical form having a cylindrical portion extending from the base thereof, a conductive ball freely disposed in said housing, a ring of insulating material secured in said cylindrical portion, a conductive cap of substantially conical form having a greater included angle than the conical portion of said housing and depending within said housing, and a cylindrical portion adapted to fit within said insulating ring and an annular flange adapted to seat on said ring the base of the cap cone connecting with the cylindrical portion by a section of toroidal form and of a radius substantially equal to the radius of the ball, forming thereby a raceway to retain bridging contact of the ball between the housing and the cap and terminals for said housing and for said cap.

2. In combination with a switch having an outer conical contact member; and inner conical contact member having a toroidal raceway in ball-cooperative relation to the outer contact member, said contact members being insulated one from the other, the inner contact member having a greater included angle than the outer contact member whereby the ball is retained in bridging contact between the members during any rolling action other than in a direction toward righting thereof with the conical members in inverted position.

In testimony whereof I have affixed my signature.

RALPH C. BIGELOW.