Nov. 16, 1937. M. K. HINDE 2,099,483

AUTOMATIC CIRCUIT BREAKER

Filed Sept. 16, 1936

Fig. 1.

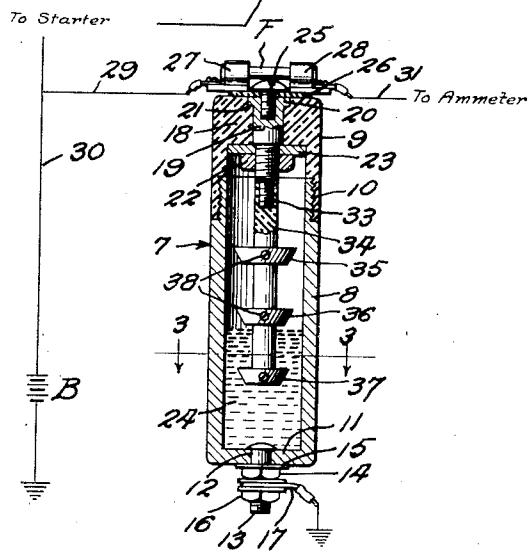


Fig. 2.

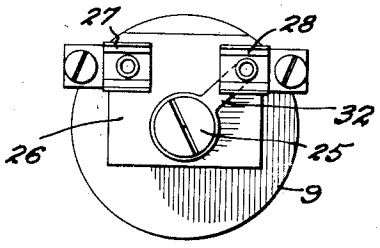


Fig. 3.

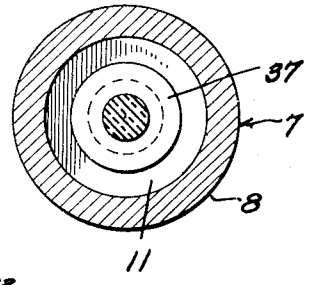


Fig. 4.

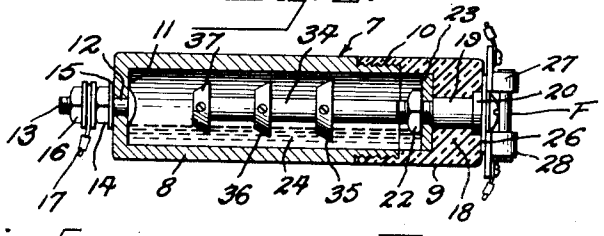


Fig. 5.

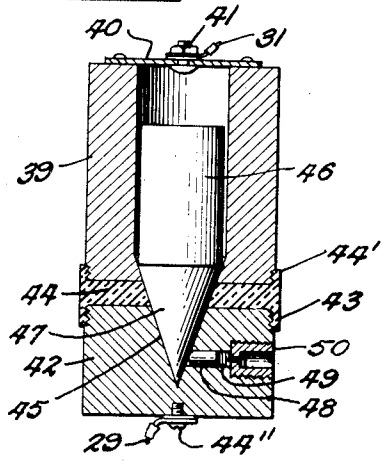
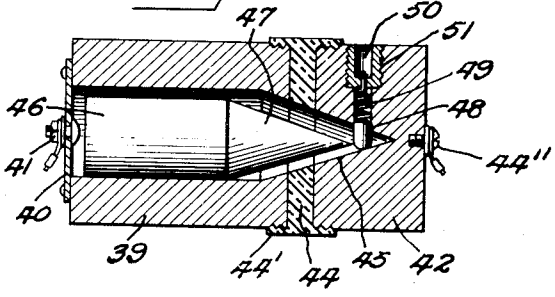


Fig. 6.



Inventor

M. K. Hinde

By Mason Fenwick & Lawrence

Attorneys

Patented Nov. 16, 1937

2,099,483

UNITED STATES PATENT OFFICE

2,099,483

AUTOMATIC CIRCUIT BREAKER

Marion Kelly Hinde, Atlanta, Ga.

Application September 16, 1936, Serial No. 101,144

6 Claims. (Cl. 200—52)

This invention relates to improvements in circuit breakers in general, and has particular reference to a circuit breaker adapted to be mounted on an automobile for the purpose of automatically breaking the ignition circuit of the motor whenever the automobile becomes either inverted or tilted at a dangerous angle.

In the prior art circuit breakers have been applied to automobiles for this purpose, but the break in the circuit upon inversion or tilt of the automobile occurs only while the vehicle is inverted or tilted and becomes closed when the vehicle is returned to proper position. This frequently results in setting fire to the vehicle, because the inversion, whether due to collision or otherwise, usually effects the release of gasoline fumes or vapors which are likely to cause fire by coming in contact with live wires of the ignition system.

It is the main object of the present invention, therefore, to provide a circuit breaker in the ignition circuit of a motor vehicle, which will break the circuit upon inversion of the vehicle or its tilt to a dangerous angle, and which will maintain the circuit broken after the righting of the vehicle and until the circuit is deliberately closed by an operator.

Other objects of the invention will become apparent as the detailed description thereof proceeds.

In the drawing:

Figure 1 is a diagrammatic layout of a preferred form of the invention, and including a circuit breaker shown in central longitudinal section;

Figure 2 is a top plan view, to an enlarged scale, of the circuit breaker shown in Figure 1;

Figure 3 is a horizontal section, to an enlarged scale, taken on the line 3—3 of Figure 1;

Figure 4 is a section similar to that shown in Figure 1, but with the circuit breaker in horizontal position;

Figure 5 is a central longitudinal section through another form of circuit breaker; and

Figure 6 is a section similar to Figure 5, with the circuit breaker in horizontal position.

Referring to the drawing, in which similar parts are designated by like numerals:

The circuit breaker illustrated in Figures 1 to 4 of the drawing comprises a cylindrical casing designated generally by the reference numeral 7. The casing 7 is constructed of two parts 8 and 9 connected to each other by screwthreads 10. The lower part 8 is made of conducting material and has the bottom 11 provided with an aperture 12 to receive a bolt 13 which may be locked to the bottom 11 by means of the nut 14 and washer 15. A second nut 16, screwthreaded onto the bolt 13, is used to clamp a contact terminal member 17 in position to ground the lower part 8.

The upper part 9 of the cylinder 7 is made of insulating material and has the head 18 thereof apertured axially to receive the conducting member 19. The member 19, provided with a head 20, is received in a countersink 21 formed in the said head. The lower part of the member 19 is screwthreaded to receive a nut 22 which serves to clamp the conducting disc 23 against a shoulder formed on the member 19. The disc 23 is of the same diameter as the interior of the cylindrical member 7 and serves as a contact element between the conducting part 8 of the cylinder 7 and the conducting member 19 when the cylinder is moved from a vertical to a horizontal position, and the mercury 24, contained in the cylinder, closes the circuit between said part 8 and member 19.

The upper end of the member 19 is axially bored and screwthreaded to receive a conducting screw 25 which is used to clamp a small sheet of insulating material 26 against the head 18 of the part 9, and against the head 20 of the conducting member 19. A sheet 26 forms the support for a pair of fuse clips 27 and 28, which are riveted or otherwise suitably secured, in proper spaced apart relation, to the sheet 26.

The clip 27 may be connected by the wire 29 to the wiring 30 connecting the battery B to the starter, the battery B being grounded as usual to the framework of the vehicle. The clip 28 may be connected by a wire 31 to the ammeter (not shown) which is usually mounted on the dash-board of a vehicle. A fuse F inserted in the clips 27 and 28 closes the circuit between the wires 29 and 31. Obviously when the line through the fuse is grounded, the fuse will "blow", and maintain the circuit broken until a new fuse shall have been placed in the clips.

To complete the circuit between the conducting member 19 and the fuse clip 28, a strip of conducting material 32 is secured at one end to the base of the clip 28, and at its other end is apertured to receive the shank of the screw 25, and to be clamped by the head of said screw against the supporting sheet 26.

In order to prevent grounding of the circuit by a splashing of the mercury in the cylinder 7, due to passage of the vehicle over rough roads, and without any tilting of the cylinder to horizontal position, the lower end of the conducting member 19 is provided with an externally screwthreaded projection 33 to which is connected, detachably, a rod 34 of insulating material. Spaced apart along the rod 34 is a series of discs 35, 36, and 37, suitably secured in position by screws 38. The discs 35, 36, and 37 are beveled downwardly so as to deflect downwardly in the

cylinder 7, any mercury which might come in contact with the beveled periphery of the discs by vertical splashing of the mercury. Preferably the discs increase in diameter with their distances from the bottom of the cylinder 7, so as effectively to prevent short-circuiting of the system by splashing of the mercury due to the passage of the vehicle over rough roads.

The invention illustrated in Figures 5 and 6, performs the same function as that shown in Figures 1 to 4. In the second form, however, the fuse is eliminated, and the circuit is broken mechanically and remains broken until an operator sets the device to close the circuit. The second form, therefore, comprises a cylinder 39, of conducting material, and closed at the top by a detachable plate 40. A contact terminal 41 connects the plate 40 to the wire 31 leading to the ammeter on the dash-board of the vehicle.

A conducting member 42 is screwthreaded at its upper end to seat in a screwthreaded flange 43 projecting below the lower face of an annulus 44 of insulating material which separates the members 39 and 42. A screwthreaded flange 44' projects above the upper face of annulus 44 and is internally screwthreaded to mesh with the screwthreads on the lower end of cylinder 39. The annulus 44 and the flanges projecting therefrom constitute an insulated coupling and separator for the members 39 and 42. The lower end of the member 42 is provided with a contact screw 42'' adapted to be connected by the wire 29 to the line 30 connecting tthe battery B to the starter.

The cylinder 39 is bored throughout the greater part of its length to meet the base of a cone 45 formed in the said cylinder 39, annulus 44 and conducting member 42. A circuit closer 46 is mounted to slide freely in the bore of the cylinder 39, and has its lower end 47 shaped as a cone to fit the cone 45 formed in the members 39, 42 and 44.

It will be apparent from Figure 4 of the drawing that when the device is in vertical position, the member 46 will bridge the insulating annulus 44 to close the circuit between the wires 29 and 31. When the device is tilted to the horizontal, or relative thereto as shown in Figure 6 of the drawing, the circuit closer 46 slides in the cylinder 39 out of contact with the member 42 and breaks the circuit through the wires 29 and 31.

In order to maintain the circuit broken during the righting of the vehicle, the member 42 is bored radially to receive slidably a rod 48 of insulating material. The rod 48 is connected by a spring 49 to a plug 50 which is screwthreaded into an internally screwthreaded bore 51 formed in the side of said member 52.

Obviously, the spring 49 will force the rod 48 across the axis of the closer 46 whenever the latter is moved away from circuit closing position, shown in Figure 5 of the drawing, to circuit breaking position shown in Figure 6. Obviously, too, the rod 48 when in position shown in Figure 6, will maintain the circuit broken until the operator withdraws the rod 48 by means of the plug 50 and spring 49 to permit the closer 46 to move by gravity into circuit-closing position when the vehicle is in upright position.

Numerous variations may doubtless be devised by persons skilled in the art without departing from the principles of my invention. I, therefore, desire no limitations to be imposed on my invention, except such as are indicated in the appended claims.

What I claim is:

1. A circuit breaker comprising a cylindrical casing adapted to be mounted on an automobile in normally vertical position, said casing including a lower conducting part adapted to be grounded to the automobile, and an upper insulating part detachably connected to the lower part and forming an insulated support for fuse clips, fuse clips secured to said upper part, a conducting member extending through said upper part and electrically connected to one of said clips, and a conducting liquid partly filling the lower part while the latter is in vertical position and adapted to close the circuit between said lower part and said conducting member when the casing is moved from vertical to horizontal position.

2. The combination with the device set forth in claim 1 of insulating means connected to said conducting member and depending axially of the casing into said liquid to prevent splashing of the liquid conductor from said lower part into contact with said conducting member.

3. The combination with the device set forth in claim 1 of a rod of insulating material connected to and depending from said conducting member and extending axially of said casing into said liquid, and a series of annular baffle plates spaced lengthwise of said rod to prevent contact of the conducting liquid with said conducting member while the casing is in vertical position.

4. The combination with the device set forth in claim 1 of a rod of insulating material connected to and depending from said conducting member and extending into the liquid in said lower part, and a series of annular baffle plates spaced lengthwise of said rod to prevent contact of the conducting liquid with said conducting member while the casing is in vertical position, the peripheries of said baffle plate being beveled toward the axis of said rod and the said lower part for deflecting the conducting liquid downwardly while the casing is in normal vertical position.

5. The combination with the device set forth in claim 1 of a rod of insulating material connected to and depending from said conducting member and extending into said lower part, and a series of annular baffle plates spaced lengthwise of said rod to prevent contact of the conducting liquid with said conducting member while the casing is in vertical position, said baffle plates increasing in diameter as they recede from said lower part.

6. A circuit breaker comprising a cylindrical casing adapted to be mounted on an automobile in normally vertical position, said casing including a lower conducting part and an upper insulating part detachably connected to each other, a conducting member extending through said upper insulating part, contact terminals connected to said lower part and member, a conducting liquid partly filling said lower part while the latter is in vertical position and adapted to close the circuit between said terminals when the casing is moved from vertical to horizontal position, a rod of insulating material connected to and depending from said conducting member, and a series of annular baffle plates placed apart lengthwise on said rod to prevent contact of the conducting liquid with said conducting member while the casing is in vertical position.

M. KELLY HINDE.