

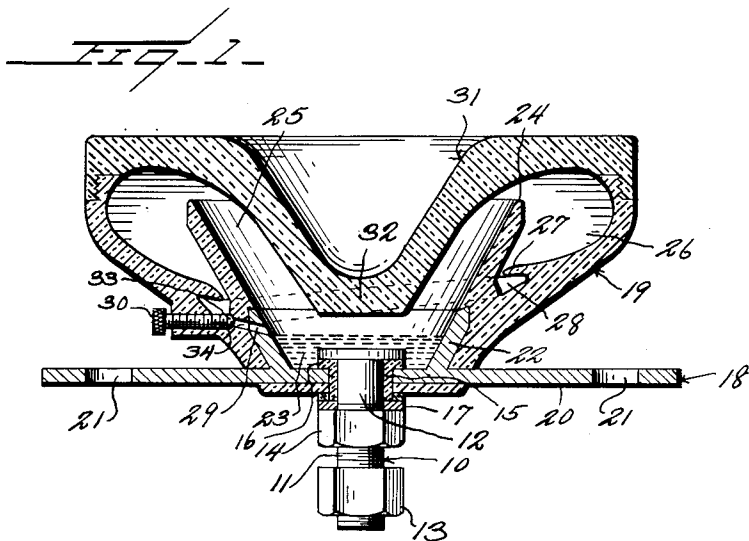
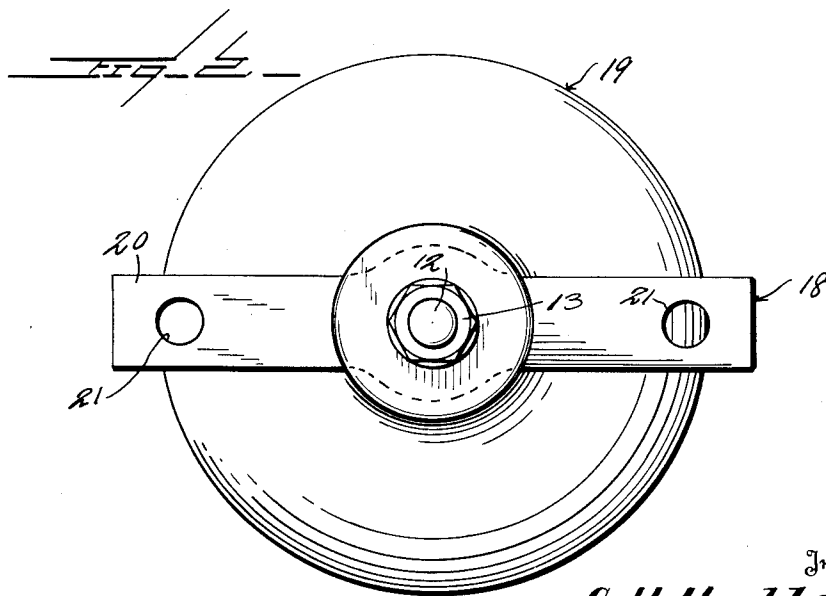
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C. H. HADLEY ET AL

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AUTOMATIC CIRCUIT BREAKER

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AUTOMATIC CIRCUIT BREAKER

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The present invention relates to circuit breakers and more particularly to automatic circuit breakers.

An object of this invention is to provide a circuit breaker which may be used in circuits of vehicles, airplanes or the like so as to break the electric circuit when the vehicle, airplane or the like is tilted or turned over or otherwise moved out of its normal operative position.

Another object of this invention is to provide a circuit breaker of this kind which will break the electric circuit in which it is interposed and which will maintain the circuit in broken or open condition until the breaker is manually operated to again close the circuit.

A further object of this invention is to provide a circuit breaker of this kind which may be interposed at any point within an electric circuit and which will break the circuit when the device to which it is attached is turned or moved out of the ordinary operative position.

A still further object of this invention is to provide a circuit breaker of this kind which may be attached to a vehicle or airplane and which will break the electric circuit or circuits in the vehicle or plane when the vehicle or plane is in a collision or is stopped abruptly, so as to open the electric circuits and prevent short circuiting thereof.

The above and various other objects and advantages of this invention will in part be described in and in part be understood from the following detailed description of the present preferred embodiment, the same being illustrated in the accompanying drawings, wherein:—

Figure 1 is a sectional view partly in detail taken substantially through the center of a device constructed according to the preferred embodiment of this invention, and

Figure 2 is a detail bottom plan view of the device.

Referring to the drawings wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 10 designates an electrode or bolt for receiving a terminal or wire, the electrode 10 comprising a threaded bolt 11 having a headed inner end portion 12 and a nut 13

threadably mounted thereon so as to secure the terminal to the electrode 10.

A second lock nut 14 is threadably mounted on the bolt 11, and an insulating sleeve or collar 15 is disposed about the upper end of the bolt 11, this sleeve 15 being provided with an annular flange 16 for engagement with the head 12 of the bolt 11, and a washer 17 is interposed between the nut 14 and the sleeve 15.

A second electrode generally designated as 18 is disposed about the sleeve 14 and is partially embedded in a cup-shaped member generally designated as 19. The washer 17 and the flange 16 engage the central portion of the electrode 18 so as to hold the electrode 18 in tight engagement about the central or first electrode 10. A portion of the cup member 19 is disposed below the bottom of the electrode 18 and is interposed between the bottom of the electrode and the washer 17 so as to insulate the electrode 18 from the electrode 10.

This electrode 18 comprises an elongated bar or plate 20 which is provided with apertures 21 adjacent the outer ends thereof whereby to receive attaching bolts or the like. The central portion of the bar or plate 20 is provided with an upwardly and outwardly flared cup member 22 which is preferably constructed of metal in the form of copper or the like, and is constructed integrally with the plate 20. This metal cup member 22 is disposed within the outer cup 19. A liquid conductor 23 is mounted within the inner cup member 22 and is adapted to establish and maintain a connection between the electrode 10 and the electrode 18. This liquid 23 may be of any desired composition to effectively establish an electrical connection between the two spaced electrodes, but is preferably composed of mercury or the like.

The inner cup 22 is provided with an extension 24 which is preferably constructed of the same material as the outer cup member 19, this material being preferably of insulating composition such as bakelite, hard rubber or the like. The extension 24 divides the outer cup 19 into two compartments, an inner compartment 25 and an outer compart-

ment 26, the purpose for which will be hereinafter described.

An annular baffle 27 is formed integrally with the outer cup 19 and extends downwardly so as to provide a liquid retaining chamber 28, this chamber 28 being disposed on an angle and inclined downwardly toward a passage 29 which connects the chamber 26 with the chamber 25.

A valve member 30 is mounted in the outer cup member 19 and normally closes the passage 19 so that when the liquid 23 flows over the extension 24 into the outer chamber 26, the liquid will be normally maintained within this chamber 26 until the valve 30 has been opened so as to permit the liquid to flow back into the inner chamber 25.

A cap generally designated as 31 is threadably mounted on the outer cup 19, this cap 31 being provided with a downwardly extending baffle 32 which terminates in spaced relation to the top of the electrode 10, this baffle 32 being constructed so as to prevent undue splashing or movement of the liquid 23 when the vehicle is in motion. The extension 24 terminates at a point spaced inwardly from the inner surface of the cap 31 so that the liquid 23 may readily flow from the inner chamber 25 to the outer chamber 26 when the vehicle is tilted to a predetermined degree.

The inclination of the cup 22 is preferably such that when the vehicle is tilted to what might be determined a dangerous degree, the entire liquid 23 will flow from the inner chamber 25 to the outer chamber 26 and be disposed in the chamber 28 beneath the baffle 27. Due to the inclination of the bottom of the chamber 28, the liquid will flow toward the valve member 30 and when the vehicle is again righted or brought back to normal position, the vehicle cannot be operated until the valve member 30 is manually opened so as to permit the liquid to flow inwardly to the inner chamber 25 and form a connection between the electrode 18 and the electrode 10.

It will be obvious from the foregoing that a simple automatic circuit breaker has been devised which will prevent short circuiting of any of the circuits of the vehicle upon turning over of the vehicle or when the vehicle has collided with an object or another vehicle.

It will, of course, be understood that a great many of accidents at present occurring are the result of burning of the vehicle caused by short circuiting of the source of electric supply, but where a device constructed according to the preferred embodiment of this invention has been interposed in the main electric circuit and preferably between the battery and the frame of the vehicle, when the vehicle is tilted unduly or collided with an object, the fluid 23 will be carried over the top of the insulating extension 24 into the outer chamber 26, thereby breaking the connection

between the inner electrode 10 and the outer electrode 18.

The valve member 30 is preferably threaded into the outer cup member 19 so that in order to open the valve, it can be readily turned so as to move the head 33 away from the seat 34 and thereby permit the liquid 23 to flow back into the inner chamber and thereby re-establish the electrical connection between the inner and outer electrodes 10 and 18, respectively. Through the use of the inner baffle 27, when the vehicle is righted, the liquid will be held within the chamber 28 by this baffle 27 so that it will not flow over the outer surface of the extension 24 and into the inner chamber 25.

While we have stated that the circuit breaker herein disclosed may be attached or interposed in the electric circuit between the battery and the ground or the frame of the vehicle, we do not wish to be limited to this particular position as the circuit breaker may be interposed at any desired point in the main circuit of the vehicle so as to break the main circuit and the supplemental circuits when the vehicle is tilted or has collided with another object.

It is, of course, understood that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

We claim:—

1. A circuit breaker of the character described comprising a casing of non-conducting composition, a pair of electrodes mounted within the casing in spaced relation to each other, an inverted frusto-conical baffle mounted within the casing and dividing the casing into an inner and an outer chamber, said baffle terminating at the upper end thereof in spaced relation to the adjoining wall of the casing whereby to provide a continuous passage from the inner chamber to the outer chamber, a liquid conductor mounted within the inner chamber and normally contacting with each of said electrodes, said casing having a passage connecting the inner and the outer chambers adjacent the lower end thereof, and a normally closed valve member closing said opening.

2. A circuit breaker of the character described comprising a casing, a pair of electrodes mounted in the casing in spaced relation to each other, an upwardly and outwardly inclined partition member mounted within the casing and dividing the interior of the casing into an inner and an outer chamber, said partition terminating at the upper end thereof in spaced relation to the adjoining wall of the casing, said outer chamber having the bottom thereof inclined with respect

to the horizontal, a liquid conductor mounted within the inner chamber and normally connecting the spaced electrodes, a baffle carried by the casing and dividing the outer chamber into two chambers, said casing having a passage connecting one of said outer chambers with said inner chamber, and a manually controlled valve member normally closing said passage.

10 3. A circuit breaker of the character described comprising a cup-shaped casing, a pair of spaced electrodes mounted within said casing in spaced relation to each other, means dividing the casing into an inner and an outer chamber, a cap threadably mounted on said casing, a baffle carried by said cap and extending downwardly into the inner chamber, and a liquid conductor mounted within the inner chamber and normally connecting said spaced electrodes.

20 4. A circuit breaker of the character described comprising a casing, a pair of electrodes mounted within the casing in spaced relation to each other, a frustro-conical partition dividing the casing into an inner and an outer chamber, a cap for said casing, a baffle carried by said cap and extending downwardly into the interior of the inner chamber and terminating closely adjacent one of said electrodes, said partition terminating at the upper end thereof closely adjacent the inner surface of said cap whereby to provide a continuous passage from the inner to the outer chambers, said outer chamber having the lower edge portion thereof inclined with respect to the horizontal, a baffle disposed within said outer chamber, said casing having a passage connecting said inner and said outer chambers and disposed at the lowermost point of the inclined bottom of said outer chamber, a manually operated valve member normally closing said passage, and a liquid conductor mounted within said inner chamber and normally connecting said electrodes, said conductor upon tilting of the casing being adapted to flow from said inner to said outer chamber whereby to break the contact between said electrodes and to maintain said contact broken until said valve member has been opened whereby to permit the conductor to gravitatingly flow back to said inner chamber.

In testimony whereof we hereunto affix our signatures.

55 **CLAIR H. HADLEY.**
BERYL L. HADLEY.