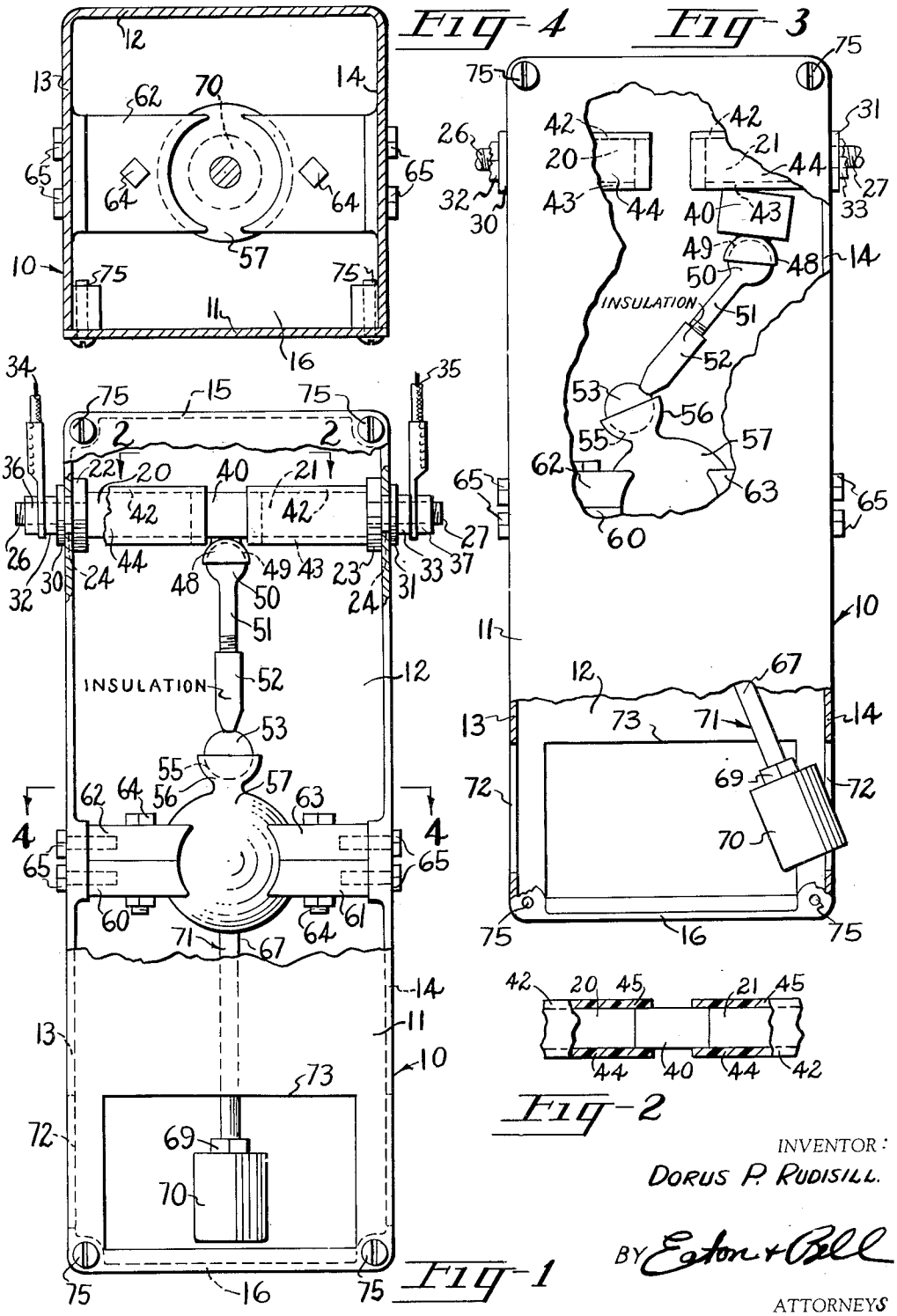
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IMPACT CIRCUIT BREAKER

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IMPACT CIRCUIT BREAKER

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This invention relates to impact circuit breakers or switches of a type adapted to be placed in the electrical circuit of a movable vehicle to automatically open the electrical circuit upon the vehicle receiving a jarring impact.

It is an object of this invention to provide a circuit breaker adapted to be applied to and connected in the electrical circuit of a vehicle such as an automotive vehicle for automatically breaking the electrical circuit upon an impact being imparted to the automotive vehicle as when the same is wrecked or overturned.

It is another object of this invention to provide a circuit breaker of the type described wherein a pair of fixed contact members are provided connected to the electrical circuit of the vehicle and spaced apart from each other and a contact bar is mounted for sliding movement between the first-named contact members and means are provided for withdrawing the contact bar from between the fixed contact members upon a sudden jolt or impact being imparted to the vehicle to thus break the electrical circuit and minimize the danger of fire or explosion when the vehicle is involved in a wreck.

It is another object of this invention to provide, in an apparatus of the type described, a pivoted member having a ball universally mounted therein and disposed below the contact bar when it is in position between the fixed contact members and to provide a weighted pendulum which is fixed to the ball and depends therefrom and to further provide a connection between the ball and the contact bar whereby, upon a sudden stop of the moving vehicle, the weighted pendulum will swing in such a manner as to partially rotate the ball and to in turn cause the connecting member between the ball and the contact bar to be moved out of its normal vertical plane thus causing the contact bar to move downwardly from between the fixed contact members to thus break the circuit between the the fixed contact members.

Some of the objects of the invention having ben stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of the improved circuit breaker showing the same disposed with a housing, the front wall or cover of the housing being broken away for purposes of clarity;

Figure 2 is a fragmentary top plan view with parts broken away and other parts in section taken substantially along the line 2—2 in Figure 1 and omitting the housing;

Figure 3 is an elevation of the circuit breaker

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shown in Figure 1 but showing the parts in a different position and with parts broken away;

Figure 4 is a sectional plan view taken substantially along the line 4—4 in Figure 1 showing the manner in which the pendulum is mounted for universal movement in the housing therefor.

Referring more specifically to the drawings, the numeral 10 broadly designates a housing which may be of any desired shape, and is shown as being substantially rectangular in shape. This housing has front, rear, side and upper and lower walls 11, 12, 13, 14, 15 and 16, respectively, suitably joined together. A pair of horizontally spaced fixed contact members 20 and 21, preferably rectangular in cross-section, are insulatably secured at the opposed ends thereof to the proximate surfaces of the side walls 13 and 14 adjacent the upper end of the housing 10. In this instance, there is shown a pair of insulation washers 22 and 23 disposed between the opposed ends of the fixed contact members 20 and 21 and the proximate surfaces of the walls 13 and 14 of the housing 10. The washers 22 and 23 each has a restricted portion 24 integral therewith which slidably penetrates the walls 13 and 14. These washers 22 and 23 are slidably penetrated by restricted terminal portions 26 and 27 integral with the fixed contact members 20 and 21.

The terminals 26 and 27 have insulation washers 30 and 31, respectively, slidably mounted thereon which are held against the remote surfaces of the side walls 13 and 14 by nuts 32 and 33 threadably mounted on the terminal portions 26 and 27 of the respective fixed contact members 20 and 21. It is thus seen that the nuts 32 and 33 also serve to hold the fixed contact members 20 and 21 in position adjacent the side walls 13 and 14.

The terminal portions 26 and 27 have the ends of wires 34 and 35 secured thereon and held in place against the corresponding nuts 32 and 33 by lock nuts 36 and 37, respectively, threadably mounted on the restricted portions 26 and 27 of the respective fixed contact members 20 and 21. These wires 34 and 35 may constitute the main cable of a battery which is severed and the severed ends thereof being represented by the wires 34 and 35 to thus place the contact members 20 and 21 in the electrical circuit of the vehicle so that electricity will flow from the battery through wires 34 and 35 through the medium of the fixed contact members 20 and 21 and a movable contact member 40.

The fixed contact members 20 and 21 are preferably surrounded by suitable insulation material,

each of the fixed contact members 20 and 21 being provided with upper and lower sheets of insulation material 42 and 43, respectively, as well as rear and front sheets of insulation material 44 and 45, respectively. The lower sheets 43 of insulation material terminate flush or short of the proximate ends of the fixed contact members 20 and 21 and the upper rear and front sheets of insulation material 42, 44 and 45 respectively project toward each other beyond the proximate faces of the fixed contact members 20 and 21, the sheets 44 and 45 serving as guides between which the movable contact member 40 may have vertical sliding movement.

It is evident that the insulation material surrounding the fixed contact members 20 and 21 is provided merely as a safety device and if so desired, the proximate ends of the spaced fixed contact members 20 and 21 may be suitably grooved for slidable reception of the movable contact member 40. Also, it is evident that suitable spring means may be provided in association with either the movable contact member 40 or the fixed contact members 20 and 21 to normally urge the contact members 20 and 21 and the movable contact member 40 into sliding engagement with each other. However, it is to be understood that this spring means is an optional feature and is not essential to the operation of this apparatus.

Projecting downwardly from the lower surface of the movable contact member 40 is a projection 48 which is provided with a socket 49 for reception of a ball portion 50 integral with a connecting rod 51, the walls of the socket being so formed as to permit the ball 50 to rotate therein but to prevent the ball from becoming disengaged from the socket. The connecting rod 51 extends downwardly and is threadably inserted in a connecting rod adapter 52 having a ball portion 53 integral therewith and projecting from the lower end thereof in Figure 1.

The ball 53 on the lower end of the connecting rod adapter 52 is pivotally mounted in a socket 55 formed in an upwardly projecting portion 56 integral with a substantially spherically shaped member or pendulum support 57. It is preferable that the pendulum support 57 be electrically insulated from the movable contact member 40 and, in this instance, the connecting rod adapter 52 is made of an insulation material. The spherically-shaped pendulum support 57 is mounted for sliding and partial rotary movement between the concave proximate surfaces of horizontally disposed lower frame members 60 and 61 to which upper frame members 62 and 63, respectively, are suitably secured as by bolts 64. The outer ends of the frame members 60 to 63, inclusive, are secured, by any suitable means such as screws 65, to the corresponding side walls 13 and 14 of the housing 10.

A weight connecting rod 67 is threadably embedded, at its upper end in Figure 1, in the lower portion of the spherically-shaped member 57, and this weight connecting rod 67 has a weight member 70 threadably secured on the lower end thereof and held in position as by a nut 69. The connecting rod 67 and the weight member 70 comprise a pendulum 71 which, during normal operation of the movable vehicle, within which the device or housing 10 is adapted to be disposed, may have free swinging movement but may be so adjusted so as not to move sufficiently to withdraw the movable contact member 40 from between the fixed contact members 20 and 21 under normal conditions.

However, upon a sudden jolt which may be caused by impact of the moving vehicle with another object, for example, the jolt will cause the weight member 70 to swing from the position shown in Figure 1 to substantially the position shown in Figure 3. It is evident that this will transmit partial rotation to the spherically-shaped pendulum support 57 thus causing the movable contact member 40 to be withdrawn from between the fixed contact members 20 and 21 to thus break the circuit between the fixed contact members 20 and 21. The side walls 13 and 14 are provided with suitable openings 72 to permit the weight member 70 to swing sufficiently to remove the movable contact member 40 from between the fixed contact members 20 and 21. The front and rear walls 11 and 12 are also provided with suitable openings 73 so that the pendulum 71 may swing in any direction and the walls will not restrict movement of the weight member 70.

It is evident that the connections between the connecting rod 51 and the movable contact member 40 and the connection between the connecting rod adapter 52 and the spherically-shaped member 57 as well as the connection between the spherically-shaped contact member 57 and the frame members 60 to 63, inclusive, constitute ball and socket joints, which will permit the pendulum 71 to swing in any direction about the axis of the spherically-shaped member 57 and, in so doing, cause the movable contact member 40 to be withdrawn from between the fixed contact members 20 and 21 substantially as shown in Figure 3. It is evident that a universal joint may be employed in lieu of the ball and socket joints at opposed ends of the connecting rod 51 and the connecting rod adapter 52 if so desired.

It might be stated that the insulation material surrounding the fixed contact members 20 and 21 will also prevent the movable contact member 40 from accidentally swinging into a position following its removal from between the fixed contact members 20 and 21 to where it will again complete a circuit between the fixed contact members 20 and 21. The front wall 11 is preferably held in position by a plurality of screws 75 to permit easy removal thereof when it is desired to reposition the parts of this device following actuation of the same for breaking the electrical circuit in the vehicle.

Although the connecting rod 51 and the adapter 52 are shown as being held in fixed relation to each other due to the connecting rod 51 being threadably imbedded in the adapter 52, if so desired the connecting rod 51 may have sliding movement in the adapter 52, the lower end of the connecting rod 51 normally resting on the bottom of the bore which it slidably penetrates in the adapter 52. This will permit relative movement between the connecting rod 51 and the adapter 52 as would be the case in the event of vibrations and normal stopping and starting of the vehicle with which the present apparatus is adapted to be associated. It is also evident that upon the vehicle with the housing 10 being tilted excessively, or beyond a pre-determined angle, the pendulum 71 would swing far enough to move the movable contact member 40 away from between the fixed contact members 20 and 21 although the vehicle may not have stopped suddenly as by impact.

In the drawings and specification there has

been set forth a preferred embodiment of the invention and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a movable vehicle having an electrical circuit, an impact switch for breaking the electrical circuit in the vehicle upon sudden stoppage or overturning of the vehicle comprising a pair of fixed contact members, wires in the circuit connected to remote ends of the fixed contact members, a movable contact member mounted for sliding movement between the fixed contact members and normally completing a circuit therebetween, a pivoted pendulum having a weight member on the lower end thereof, said pivoted pendulum being disposed a substantial distance below the fixed contact members, a connecting rod universally connected at its upper end to the movable contact member and at its lower end to the upper end of the pendulum remote from the end having the weight member thereon whereby the pendulum will normally extend in a substantially vertical position and in the vertical plane of the movable contact member and, upon a sudden stop of the movable vehicle, as by impact, the pendulum will swing and will thus partially rotate about its pivot point to thus withdraw the movable contact member from between the fixed contact members, to break the electrical circuit.

2. In a movable vehicle having an electrical circuit, an impact switch connected in the electrical circuit of the vehicle comprising a pair of electrical conductors, a pair of closely spaced fixed contact members to the remote ends of which the conductors are connected, a movable contact member mounted for sliding movement between the proximate ends of the fixed contact members and normally completing the circuit therebetween, a spherically-shaped member disposed a substantial distance below the movable contact member and in substantially the same vertical plane, a pendulum depending from the spherically-shaped member, means supporting the spherically-shaped member for partial rotational and sliding movement therein, said movable member having a socket member on the lower surface thereof and said spherically-shaped member having a socket member on the upper surface thereof, said socket members being spaced substantially apart from each other, a connecting rod extending between the socket members and having ball portions on opposed ends thereof slidably mounted in said socket members whereby, upon a sudden stop of the movable vehicle, the pendulum will transmit partial rotation to the spherically-shaped member to thus permit the ball portions on opposed ends of the connecting rod to partially rotate in the corresponding socket portions of the spherically-shaped member and the movable contact member and, in so doing, to withdraw the movable contact member from between the fixed contact members to thus break the circuit between the fixed contact members.

3. In a movable vehicle having an electrical

circuit, an impact switch for breaking the electrical circuit in the vehicle upon sudden impact or overturning thereof comprising a pair of spaced contact members in said circuit, means supporting the pair of contact members, a movable contact member mounted for sliding movement between the spaced contact members and normally completing a circuit between the pair of contact members, a connecting rod universally connected to the lower end of the movable contact member and projecting downwardly therefrom, a universal mounting positioned below said contact members, a pendulum universally mounted intermediate its ends in said universal mounting in fixed relation to the means supporting the pair of contact members, said pendulum having a weight member on the lower end thereof, a universal connection between the lower end of the connecting rod and the end of the pendulum remote from the weight member, whereby, upon sudden impact of the movable vehicle, the momentum of the vehicle will cause the weight to swing the pendulum in its universal mounting to in turn swing the lower end of said connecting rod about the universal mounting of the pendulum thus causing the upper end of the connecting rod and its associated movable contact member to move downwardly to move the movable contact member out of engagement with the pair of contact members.

4. In a movable vehicle having an electrical circuit, an impact switch for breaking the electrical circuit upon impact or overturning of the vehicle comprising a housing, a pendulum universally mounted intermediate its ends in said housing and having a weight on the lower end thereof, a connecting rod, means universally connecting one end of the connecting rod to the end of the pendulum remote from the end having the weight thereon, a pair of spaced fixed contact members carried by said housing and disposed in said electrical circuit, a contact member mounted for vertical sliding movement between the fixed contact members and normally completing a circuit therebetween, means pivotally connecting the upper end of the connecting rod to the movable contact, the weight will tend to swing the pedulum thus causing the lower end of the connecting rod to swing therewith and to cause downward movement of the upper end of the connecting rod and the associated movable contact member, moving the movable contact member from between the spaced contact members to break the circuit.

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