July 2, 1940. R. E. WALTAMATH 2,206,067

MASTER SAFETY SWITCH

Filed May 21, 1938

Fig. 1

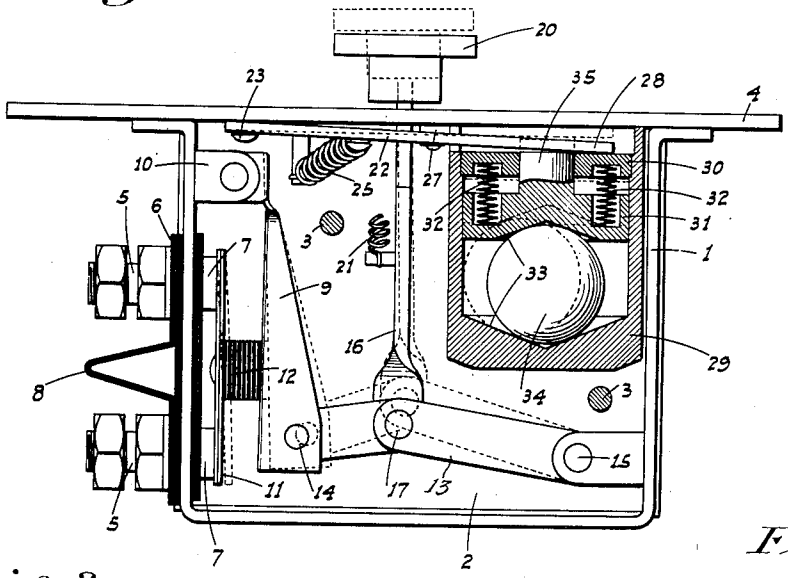



Fig. 2

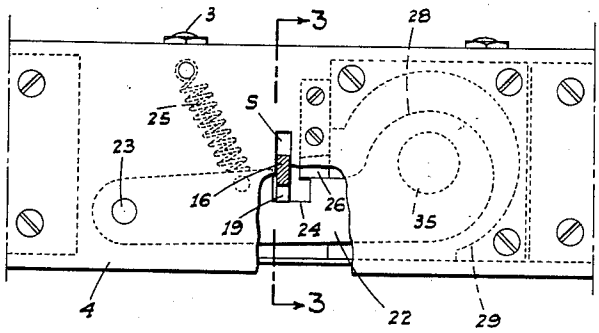



Fig. 3

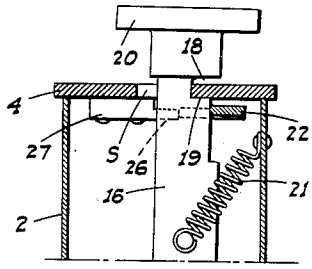



Fig. 4

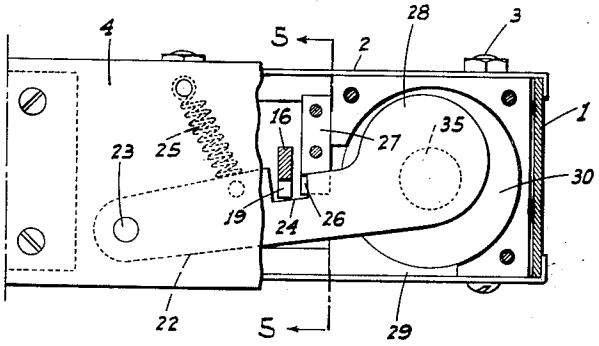
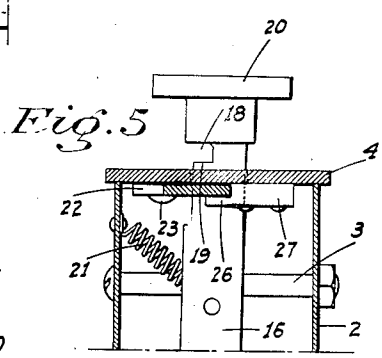



Fig. 5




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## MASTER SAFETY SWITCH

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Application May 21, 1938, Serial No. 209,304

10 Claims. (Cl. 200—52)

This invention relates generally to a switch unit for motor vehicles and in particular is directed to a safety switch for motor vehicles, the switch being normally closed and wired in the vehicle circuit as a master switch, and being an improvement over the structure of my U. S. Patent 1,591,149 dated July 6, 1926. The principal object of the present invention is to provide a switch of this character having means to automatically open the circuit upon an impact being imparted to the unit from any horizontal direction as when the vehicle is involved in an accident and strikes another object. At the same time, ordinary jars and vibrations will not actuate the device.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of the unit, the rear side plate being removed, and the impact responsive assembly being shown partly in section.

Figure 2 is a top plan view of the unit in normal position, the top plate being partly broken away and the operating knob removed.

Figure 3 is a cross-section on line 3—3 of Fig. 2.

Figure 4 is a view as in Fig. 2, but in open or circuit breaking position.

Figure 5 is a cross-section of Fig. 4, taken on line 5—5.

Referring now more particularly to the characters of reference on the drawing, the unit comprises a case 1 including side plates 2 secured in place by tie bolts 3, and a top plate 4 which extends at its ends beyond the case. The case is adapted to be mounted and depend through an opening in the floor boards of a vehicle, and with top plate 4 flush therewith, the projecting ends of said top plate being secured to the floor boards and supporting the case in rigid position.

A pair of terminals 5 extend through one end of case 1 in vertically spaced relation and insulated from each other and from the case by strips 6 of dielectric material. A contact 7 is formed with each terminal within the case. The unit is interposed in circuit in either battery cable (not shown), the adjacent ends of such cable being connected to terminals 5. A dielectric baffle 8 is mounted between the terminals and prevents accidental short-circuiting therebetween.

An arm 9 is pivoted at its upper end between ears 10 and depends therefrom for swinging movement in a vertical plane, said arm supporting a spring switch blade 11, which normally engages the ends of both contacts 7. The blade 11 is mounted on the arm 9 in insulated relation by means of a dielectric block 12. Swinging of arm 9 is controlled by means of a toggle link assembly 13, pivoted at one end, as at 14, to the lower end of the arm and pivoted at its other end in anchored relation to the case, as at 15. This toggle link assembly is disposed for upward breaking movement, and when unbroken, the arm 9 is in position with blade 11 engaging both contacts 7.

Another arm 16, relatively wide and flat, is pivoted at its lower end in connection with the central pivot 17 of toggle assembly 13; said arm being disposed in upstanding position and formed with a half twist immediately above the pivotal connection. The upper end portion of the arm is formed in one edge with a notch 18 providing an upwardly facing shoulder 19; the end portion of the arm above shoulder 19 projecting through a slot S in plate 4 which is of a length slightly greater than the width of the arm. A knob 20 is secured on the protruding end of arm 16. When the unit is in normal position, the shoulder 19 is engaged beneath the top plate adjacent one end of the slot S. The arm 16 is urged upward as well as laterally to a holding position by a loaded tension spring 21, which is connected to said arm below the shoulder and thence extends upward and away from the notched edge of the arm and is anchored to the adjacent side of the case. While the spring normally holds shoulder 19 firmly against the top plate, such spring, positioned as described, also prevents accidental lateral shifting movement which would permit accidental escape of the shoulder, and upward movement of said arm 16.

Such release of shoulder 19 and upward movement of arm 16 under tension of spring 21 would of course break assembly 13 upward resulting in inward swinging of arm 9, and disengagement of blade 11 from at least one of the contacts 7. To effect such action in the event of an accident involving the vehicle, I employ the shock or impact of the collision and through the medium of the following described mechanism:

A tripping lever 22 is disposed adjacent the under surface of the top plate and substantially parallel thereto and alongside arm 15; this lever being mounted on a loose play pivot 23. Inter-

mediate its ends, the lever is notched, as at 24, and the adjacent portion of arm 16 rides therein, the lever being urged by a tension spring 25 in a direction to shift the upper portion of the arm 16 laterally and release shoulder 19 from beneath the top plate. However, the lever is normally held against such movement by a stop element 26 projecting from a block 27 fixed on the under side of the top plate; such stop being spaced from the top plate and the lever sloping slightly from pivot 23 so that the edge of the lever may engage said stop as shown in Figs. 2 and 3.

The free end of the lever is enlarged, as at 28, and is disposed above an impact or shock responsive mechanism comprising a cylindrical housing 29 having a closure head 30. A piston 31 is slidably disposed in the bore, and is urged downwardly by compression springs 32 between the head and piston. The opposed faces of the bottom of the housing and the inner end of the piston are formed as relatively flat, cone-shaped cups 33; there being a relatively heavy steel ball 34 disposed between said faces and engaged thereby. The piston 32 is formed with an upwardly projecting neck or stem 35, which is slidably disposed in a bore extending through the head 31, the upper end of the neck normally being substantially flush with the upper surface of such head and disposed below enlarged portion 28 of lever 22.

Upon the occurrence of an accident, the shock or impact is imparted to steel ball 34 in an upward direction—due to the cone-shaped seat—and the ball is thrown upward. This moves piston 32 and neck 35 upward and as the neck engages and lifts lever 22 upward, said lever escapes from stop 26 and is shifted by spring 25 in a direction to engage the trip arm 16. Thereafter, the arm 16 rises and the switch opens in the manner hereinbefore described.

As the knob 20 is accessible to the driver, the device can be manually reset by depressing the knob while at the same time shifting the same laterally of the case in the proper direction.

The master safety switch, above described, is so constructed—as is obvious—that ordinary road shocks and the like will not actuate the same and yet actuation will occur in the event of an accident and resultant sharp impact. Also, as the device is interposed in one of the battery cables, the contacts 7 do not become hot or tend to corrode.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. A safety switch unit for motor vehicles including a switch, a normally latched element holding the switch closed, means urging the element in a switch-opening direction, and impact responsive means to unlatch said element, said means comprising a housing having a vertical bore, formed at the bottom with a cup-like seat of relatively flat conical configuration, a relatively heavy ball seated therein, a piston slidably disposed in the bore above but normally resting on the ball, and instrumentalities operatively arranged with the piston to unlatch the element upon upward movement of said piston.

2. A unit as in claim 1, in which said instrumentalities include an upstanding stem on the piston, and an element tripping lever, said stem being arranged to effect actuation of the lever upon upward movement of said stem.

3. A unit as in claim 1, in which said instrumentalities include an upstanding stem on the piston, and an element tripping lever, said stem being arranged to effect actuation of the lever upon upward movement of said stem; said tripping lever being spring urged in an element tripping direction, and normally held against movement in said direction by a stop member.

4. A safety switch unit for motor vehicles including a switch, a normally latched element holding the switch closed, means urging the element in a switch opening direction, and impact responsive means to unlatch said element, said means comprising a housing having a vertical bore, formed at the bottom with a cup-like seat of conical configuration, a relatively heavy ball seated therein, a piston slidably disposed in the bore above but normally resting on the ball, a head closing the upper end of the bore, a compression spring between the piston and head, a stem on the piston projecting through the head, and an element tripping lever, the stem and lever being arranged so that upward movement of the stem will effect actuation of said lever.

5. A safety switch unit for motor vehicles including a normally closed switch, a switch control arm, a plate having a slot therein and through which the arm projects, one edge of the arm being step cut, and the step being normally latched against the plate adjacent the slot, spring means connected to the arm and urging the same in a direction to open the switch, a tripping lever pivoted on the plate and extending alongside the arm in crossing relation, said lever being arranged upon swinging movement toward the arm to unlatch the same, another spring urging the lever in such direction, a stop normally preventing such movement of the lever, and impact responsive means to release the lever from the stop.

6. A unit as in claim 1, in which the ball engaging face of the piston is also formed as a relatively flat conical cup.

7. A unit as in claim 1, with spring means acting on the piston to resist upward movement thereof.

8. A safety switch unit for motor vehicles including with a switch, a normally latched movable element holding the switch closed, means urging the element in a switch opening direction, a relatively heavy ball, means confining and guiding the ball for upward movement upon impact in a horizontal plane from any direction and means functioning with and actuated by such upward movement of the ball to unlatch the element.

9. A safety switch unit for motor vehicles including a normally closed switch, a vertical switch control arm adapted when moved vertically in one direction to open the switch, a spring acting on said arm to move the same in said direction, means mounting said arm for limited lateral edgewise movement at its upper end, a plate having a slot therein through which said arm projects, one edge of the arm being step cut and the step being normally latched against the plate at one end of the slot, a sub-

stantially horizontal tripping lever extending across said edge of the arm, means mounting the lever at one end on the plate for swinging movement in a horizontal plane and also limited movement in a vertical plane, a spring applied to the lever to pull the same against said edge of the arm, a stop on the plate engaging the lever when the latter is in a predetermined horizontal plane and then preventing the spring from functioning and impact responsive means to lift the lever sufficiently to disengage the same from the stop.

10. A structure as in claim 9 in which the lever, when engaged with the stop is also engaged with said edge of the arm beyond the step thereon and when said step is in latching engagement with the plate whereby a resetting movement of the arm after being tripped will also reset the lever in a stop-engaging position.

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