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SAFETY LOCK

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Fig. 1.

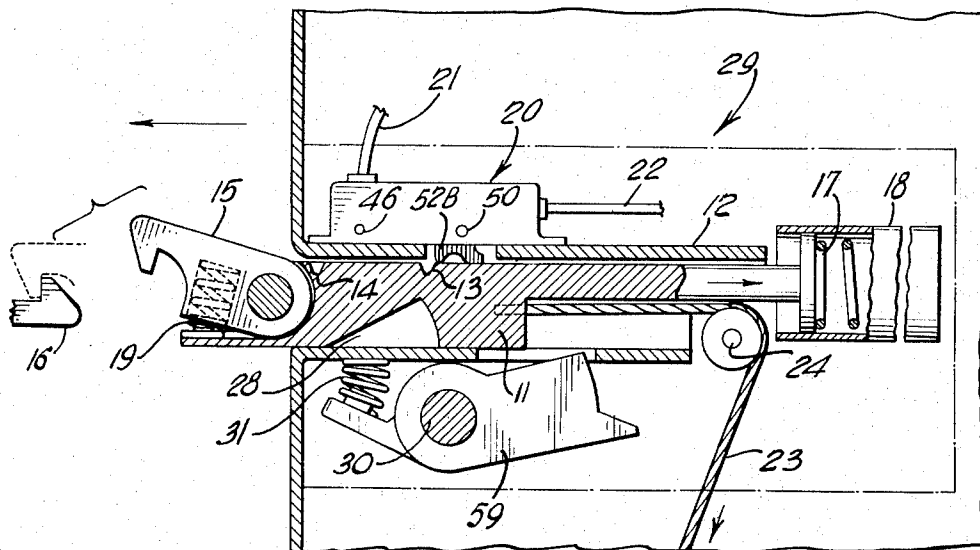
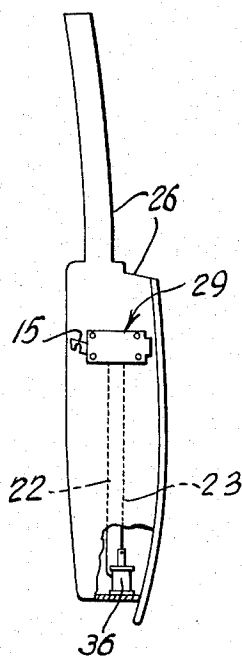


Fig. 2.



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SAFETY LOCK

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8 Claims. (Cl. 292-144)

This invention relates to a safety lock and more particularly to a safety lock for doors of vehicles such as automobiles.

It is known that the locking mechanism of automobiles currently in use is unsatisfactory in several respects. For example it requires considerable effort on the part of an individual to completely close the door. Frequently, children, elderly persons or invalids are only strong enough to close the preliminary catch of the door, leaving the door only partially latched, a distinctly unsafe condition. Another unsatisfactory feature of the locks currently in use in automobile doors is that, upon the impact of a collision, the doors are sprung open permitting the occupants to be thrown from the car greatly increasing their chances of injury.

It is an object of the present invention to provide a lock which does not require a great amount of force for complete closure. Another object of the invention is to provide a lock which is not easily opened on impact. Another object of the invention is to provide a power assist in locking the door. Still another object of the invention is to provide novel switch means whereby electrical power is supplied to the door when closing. These and other objects will be obvious to those skilled in the art from the following disclosure when considered in connection with the attached drawings in which:

FIGURE 1 is a fragmentary elevational view showing the lock mechanism;

FIGURE 2 is a perspective view showing the relationship of the lock to the door;

FIGURE 3 is a fragmentary view, partly in section showing the details of the switching mechanism; and,

FIGURE 4 is a fragmentary plan view of the switch.

Referring now to the drawings, FIG. 1 shows a bolt 11 slidably positioned in housing 12 and having a pair of transverse grooves 13 and 14 in its upper surface. A hook-shaped latch member 15 is pivotally mounted at one end of bolt 11 and is adapted to engage with companion latch-member 16 mounted on the frame of the automobile (not shown).

The other end of bolt 11 lies within a casing 18 which contains a spring 17 or other compressible means. Above housing 12 is a switch box 20 having a lead 21 connected to a source of current such as a battery (not shown) and a lead 22 connected to a solenoid as shown in FIG. 2. Bolt 11 is also connected to the solenoid by means of cable 23 which is held in position to exert a pull on bolt 11 by pulley 24. On the under side of bolt 11 is a notch 28 into which main door latch 59 fits when door is closed and locked. The figure shows the lock in the open position with main door latch 59 which pivots on hinge 30 in the released position, spring 31 being in the compressed state and springs 17 and 19 in the expanded state.

FIG. 2 shows an end view of an automobile door 26 having lock 29 affixed thereto with latch member 15 projecting from the lock housing. Lead 22 is shown connected to solenoid 36 which, when activated, exerts a pull on cable 23.

FIG. 3 shows the lock in closed position with latch members 15 and 16 engaged and bolt 11 withdrawn causing member 15 to adopt a locked position against housing 12. Main door latch 59 is also engaged with notch 28 to hold bolt 11 in the closed position. Details of this switch mechanism can be seen in this figure. Lead 21 passes

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through seal 40 in the housing of switch box 20 and along arm 41 to contact point 42. Arm 41 suitably is fabricated of a non-conducting material such as nylon. Advantageously, that portion of arm 41 which is subjected to pressure from spring 43 can be of a metallic material such as steel but that portion supporting contact point 42 should be of a non-conducting material. Arm 41 and yoke 44 are both mounted and pivot on shaft 46. At the free end of yoke 44 is a cross member more fully shown in FIG. 4 supporting contact point 48 connected to lead 22 which passes through rubber seal 39. Connecting the arms of yoke 44 is a shaft 50 on which is rotatably mounted a ratchet-cam.

FIG. 4 shows the ratchet-cam to be a double ratchet 52A and 52B with cam 53 positioned therebetween. Advantageously the ratchet-cam is molded in a single piece from a non-conducting material such as nylon. This structure of the ratchet-cam maintains the contact points in proper alignment. Spring 43 exerts downward pressure on central arm 41 which pressure is transmitted to yoke 44 either through cam 53 which is mounted on shaft 50 connecting the arms of yoke 44, or through contact points 42 and 48 which latter is supported by cross-member 54. Preferably cross-member 54 which connects the arms of yoke 44 and supports contact point 48 is composed of nylon although other non-conducting materials may be used. The pressure exerted by hold-down spring 43 thus serves to keep ratchet members 52A and 52B in close contact with bolt 11 whether contact points 42 and 48 are open or closed.

Ratchet 52A or 52B has a particular configuration which permits current to be supplied to solenoid 30 only when door 26 is being closed or on the inward movement of bolt 11. When bolt 11 is sliding outwardly to an unlatched position no current is supplied to solenoid 36. In cross-section, ratchet 52A appears as a square in which a portion has been cut away from each side leaving two surfaces on each side. It will be noted from FIG. 3 that one surface of each side is small enough to enter grooves 13 and 14 and the other surface of each side is long enough to span grooves 13 and 14.

Referring again to FIG. 1, when the door is being closed, latch member 15 is brought into contact with latch member 16 causing bolt 11 to slide inwardly. The smaller surface of the side of ratchets 52A and 52B is forced into groove 13 and the further inward movement of bolt 11 causes ratches 52A and 52B to execute a 90° rotation causing cam 53 to do likewise thereby, by means of pressure supplied by hold-down spring 43, forcing arm 41 down and bringing points 42 and 48 into contact. This completes the circuit supplying current to solenoid 36 which exerts a pull on cable 23 bringing bolt 11 into a fully-closed position. At this point, groove 14 engages the smaller surface of the sides of ratchets 52A and 52B causing them and cam 53 to execute a 90° turn thereby separating points 42 and 48 breaking the circuit to solenoid 36 as main door latch 59 snaps into notch 28. The door is now securely locked with latch member 15 engaged to latch member 16 and held firmly in position against housing 12. In this position, springs 17 and 19 are compressed and spring 31 is expanded.

To open the car door, main door latch 59 is opened by torque applied to shaft 30 thereby removing latch 59 from notch 28. Spring 17 then expands pushing bolt 11 in an outwardly direction. This action has no effect on ratchets 52A and 52B as the larger surface of the contacting side spans grooves 13 and 14. As bolt 11 slides to an open position latch member 15 is no longer restrained by housing 12 and is pushed to an open position by spring 19.

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The foregoing description presents a preferred embodiment of the present invention. For example, FIG. 2 shows the preferred location of solenoid 36 at the base of the door where it does not interfere with the operation of the window conventionally located in the automobile door. However, other suitable locations will be obvious to those skilled in the art.

Compressive means which serve as a damper to control the closing of the door and to supply the actuating force for unlocking bolt 11 have been shown as spring 17. Advantageously, pneumatic or hydraulic means may suitably be used.

Ratchets 52a and 52b have been shown as square in cross-section with a cut-away portion on each side. Although this is a preferred embodiment, a rectangular shape may also be used in which case, the ratchet would also in effect serve as a cam.

Various other changes and modifications can be made without departing from the spirit of the invention. Accordingly, it should be limited only as set forth in the following claims.

I claim:

1. A door locking mechanism comprising in combination a housing, a bolt slidably mounted in said housing and having a plurality of grooves in one surface thereof, switch means comprising a pair of contact points, a pair of hinged contact point supporting members, ratchet cam means rotatably mounted on one of said contact point-supporting members and in operative contact with the grooved surface of said bolt and electro-mechanical means controlled by said switch means for exerting a pull on said bolt.

2. The door locking mechanism of claim 1 in which said ratchet cam means comprises a part which is rec-

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tangular in cross-section with a cut-away portion dividing each side of said rectangle into a short surface and a long surface, said short surface being of a size to engage said grooves and said long surface being of a size to span said grooves.

3. The door locking mechanism of claim 2 in which said part is square in cross-section.

4. The door locking mechanism of claim 1 including a pivotally mounted latch member mounted at one end of said bolt.

5. The door locking mechanism of claim 4 in which said pivotally-mounted latch member is adapted to be held in locked position by said housing.

6. The door locking mechanism of claim 4 including compressive means at the other end of said bolt.

7. The door locking mechanism of claim 1 in which said bolt has a notch in a surface other than said grooved surface and latch means adapted to engage said notch.

8. The door locking mechanism of claim 1 in which said electro-mechanical means comprises a lead from a source of current attached to one of said contact points, a lead connecting the other of said contact points to solenoid means and a cable means connecting said solenoid means to said bolt.

References Cited

UNITED STATES PATENTS

2,598,958	6/1952	Wood	292—201 X
2,784,019	3/1957	Des Combes	292—192 X
2,834,504	5/1958	Annicq	292—201 X
2,898,138	8/1959	Van Noord	292—201 X

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