

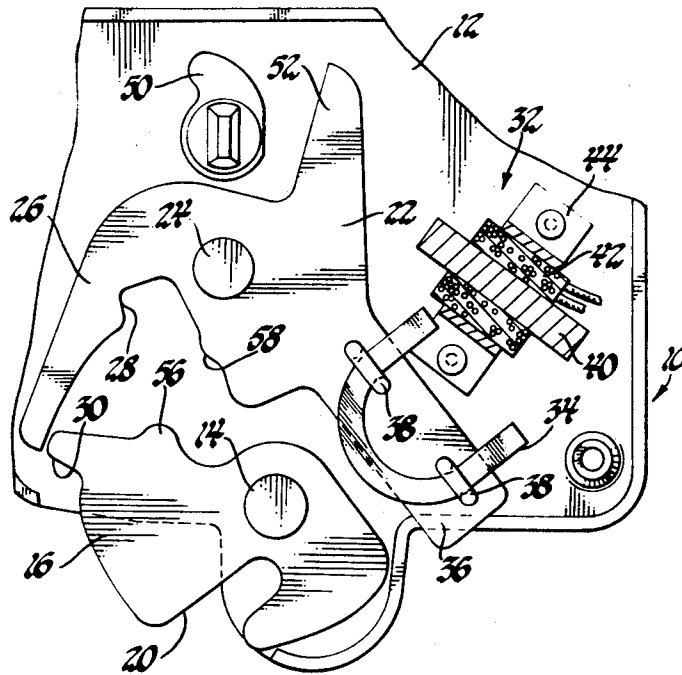
[72] **Inventor** Theodore F. Peters
 Utica, Mich.
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 [73] **Assignee** General Motors Corporation
 Detroit, Mich.

[56] **References Cited**
UNITED STATES PATENTS
 1,312,895 8/1919 Derby..... 292/201
 3,262,604 7/1966 Barnard et al. 292/251.5 X
 3,386,761 6/1968 Johnstone et al. 292/201
FOREIGN PATENTS
 461,157 1/1951 Italy 292/251.5

Primary Examiner—Richard E. Moore
Attorneys—W. E. Finken and D. L. Ellis

[54] **VEHICLE CLOSURE LATCH**
 3 Claims, 4 Drawing Figs.
 [52] **U.S. Cl.**..... 292/201,
 292/216
 [51] **Int. Cl.**..... E05c 3/26
 [50] **Field of Search**..... 292/201,
 144, 251.5, 216

ABSTRACT: A minimum-release-type of vehicle deck lid or other closure latch which includes fork latchbolt and detent lever elements provided with cam out detent shoulders and which further includes a magnetic holding arrangement for the detent lever normally opposing the cam out latch-releasing tendency of the latter until an electromagnet is selectively briefly energized to neutralize the permanent magnet and permit release of the latch.



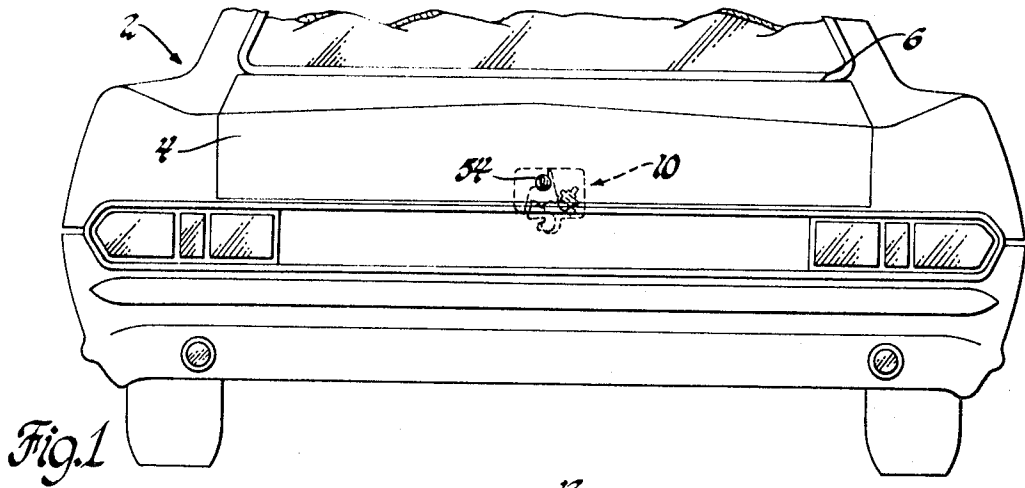


Fig. 1

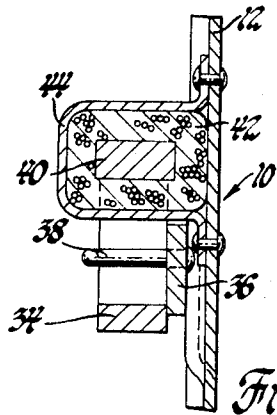


Fig. 3

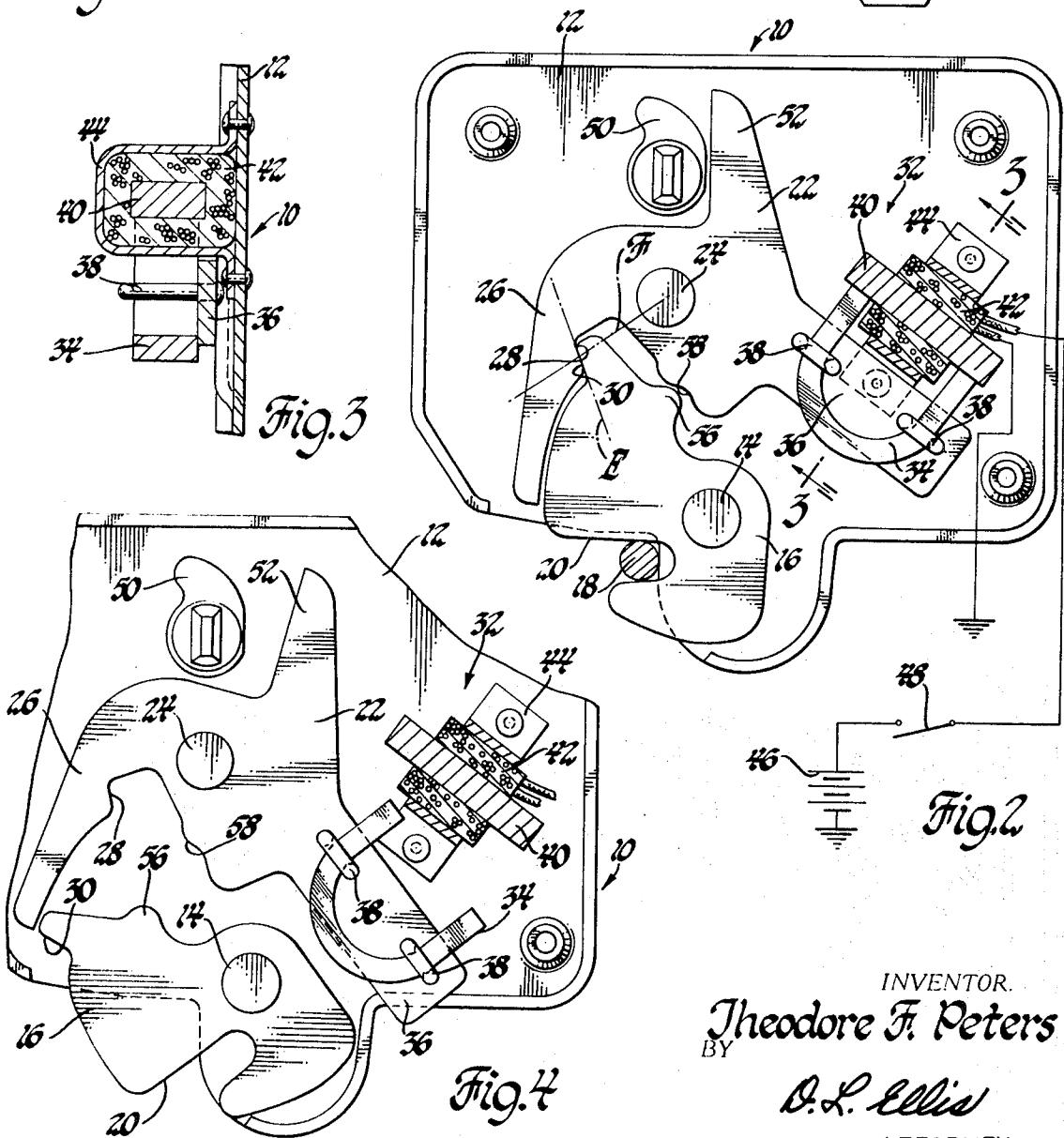


Fig. 2

Fig. 4

INVENTOR.
Theodore F. Peters
BY
D. L. Ellis
ATTORNEY

VEHICLE CLOSURE LATCH

This invention relates to vehicle closure latches and more particularly to an improved vehicle closure latch incorporating remotely controllable means for selectively releasing the closure latch.

The invention is directed to improvements in vehicle deck lid or similar closure latches of the type which employ latchbolt and detent lever elements having cooperating detent shoulders which are so formed that when engaged to hold the latchbolt in latched position, forced movement of the latchbolt toward its unlatched position, as arises from the compression of perimeter sealing strips around the vehicle deck lid, causes a substantial cam out force component tending to separate the detent shoulders and allow release of the latchbolt. In this type of latch, the cam out force components are employed to require significantly less releasing forces from either the operator's hand through a manual actuator or from conventional power operated release actuators. Typically, a blocking lever is utilized to resist the cam out force component on the detent lever to hold it in engagement with the latchbolt until selectively displaced by the operator or the remotely controlled power-operated device.

The primary object of the present invention is to provide improvement in this type of latch through utilization of magnetic remotely controllable means which normally hold the detent lever in engagement with the latchbolt in opposition to the cam out force component thereon, the magnet means being employed in a manner such that to remotely cause release of the detent lever the magnet means is neutralized momentarily to permit the cam out force to move the parts to a releasing position.

A principal feature of a preferred embodiment of the invention is that the magnetic remotely controllable means take the exceedingly simple and effective form of a permanent magnet operative for magnetic attraction between parts in the vehicle closure latch to hold the same in latched condition, such permanent magnet being selectively neutralized for release of the latch by brief application of electrical current to an electromagnetic device arranged to repel or oppose the attraction of the permanent magnet.

These and other features and advantages of the invention can be readily apparent from the following specification and from the drawings wherein:

FIG. 1 is a fragmentary rear-elevation view of vehicle body including a closure latch according to this invention;

FIG. 2 is an enlarged partially broken away view from a portion of FIG. 1 showing the closure latch in latched condition;

FIG. 3 is a sectional view taken generally along the plane indicated by lines 3-3 of FIG. 2; and

FIG. 4 is a view similar to FIG. 2 showing the latch in released condition.

Referring now particularly to FIG. 1 of the drawings the vehicle closure latch of this invention is shown in the environment of a vehicle body deck lid arrangement, although it will be appreciated that it may equally well be applied to other area of vehicle bodies or otherwise. Specifically, the vehicle body, designated generally as 2, includes a conventional rear luggage compartment covered by a vehicle body deck lid 4 hinged by suitable means adjacent its forward edge 6 for swinging movement vertically between its lowered position as shown and as raised position, not shown. The closure latch of this invention, designated generally as 10, is operative to releasably hold the deck lid in its lowered position.

The vehicle closure latch 10 is generally of the type referred to as minimum release latch in that it employs an arrangement of cooperating detent shoulders between latch bolt and detent lever elements thereof formed to provide a cam out tendency causing the detent lever element to seek a released condition. For more complete disclosure of the structural details of such a latch, reference may be had to Johnstone U.S. Pat. No. 3,347,584 issued Oct. 17, 1967. Generally, the latch includes a latch frame 12 suitably mounted on the deck lid 4, or optionally upon the body 2, the frame rotatably mounting as by a pivot stud 14 a fork-type latchbolt 16. The bolt is rotatable

between the latched position shown in FIG. 2 and an unlatched position shown in FIG. 4 wherein the bolt is respectively engaged with and disengaged from a striker element 18 fixed to the vehicle body 2. Striker 18 is conventionally formed as a U-shaped bar situated in a longitudinal vertical plane of body 2 to have its base portion indicated in the drawings engageable with a cam edge 20 of the bolt as the deck lid approaches full-lowered position, thereby to forcibly rotate the bolt clockwise to latched position wherein the striker is constrained within the bight of the bolt for latching of the deck lid. To hold the bolt in latched position, a detent lever 22 is rotatably mounted on frame 12 by a pivot stud 24, the detent lever being adapted to have a leg portion 26 thereof lie in a detenting position wherein detent shoulders 28 and 30 on the leg 26 and bolt 16 respectively are engaged to restrain the bolt in latched position. As explained more fully in the Johnstone patent, shoulders 28 and 30 are formed along a line E so situated angularly with respect to the line F drawn between the point of shoulder engagement and the center of stud 24 that forced counterclockwise rotation of bolt 16 toward its unlatched position provides a substantial force component moving the detent lever clockwise about its pivot toward its released position, shown in FIGURE 4.

In accordance with a principal feature of the present invention, this cam out tendency on the detent lever is normally opposed by remotely controllably magnetic apparatus designated generally as 32. It comprises in the preferred embodiment a generally U-shaped permanent magnet member 34 having its legs secured to a leg 36 of detent lever 22 by staples 38 or other suitable securement. Magnet 34 is preferably formed of an Alnico or similar alloy having substantial attraction force with respect to a proximately located magnetizable member on frame 12 such that whatever forces arise on bolt 16 as by the pressure of a perimeter seal strip around deck lid 4, the cam out force component causing clockwise rotation of the detent lever 22 is effectively counteracted by the attraction of magnet 34 to hold the detent lever in its detenting position of FIGURE 2.

According to another feature of the invention the magnetic attraction of magnet 34 is to be selectively briefly interrupted to permit remotely caused release of latch 10, and this accomplished by use of a second magnetic element comprising an electromagnet formed from a soft iron core 40 having wound therearound an electrical coil 42. This electromagnet unit is suitably mounted on frame 12 by a bracket 44 in a position such that the core 40 forms the magnetizable element to which permanent magnet 34 establishes its attraction for its normal pulling or holding of the detent lever in its detenting position. Thus, in the latter position, the spaced legs of magnet 34 are directly relatively strongly engaged upon core 40, while in the released position, the magnetic attraction therebetween is reduced permitting the displaced positions of the bolt 16 and the detent lever shown in FIG. 4. Coil 42 is electrically connected in circuit with the vehicle battery 46 and a normally open control switch 48 which may be conveniently located in the driver's area of the vehicle passenger compartment or in the instrument panel glove box. Coil 42 is constructed such that when switch 48 is selectively closed for energization of the coil a magnetic field is induced in core 40 in opposition to that of the permanent magnet 34, i.e. the creation of magnetic poles in the opposite ends of core 40 each of like sign with the respective adjacent pole of the permanent magnet 34. The result is of course a magnetic repulsion between the pole piece or core 40 of the electromagnet and the permanent magnet 34 operative to reduce or neutralize the holding force of the latter, thereby permitting the cam out force component of shoulders 28 and 30 to cause release of the detent lever and permit rotation of the latch bolt 16 to unlatched position.

Latch 10 is also provided with a manual release actuator or rollback 50 rotatable on frame 12 in a clockwise direction to engage a leg 52 of the detent lever for clockwise release of the same by manually overcoming the attraction of magnet 34.

The rollback may be conventionally operated by a cylinder lock actuator 54 located on deck lid 2.

In the preferred embodiment, it is noted that no springs are provided on the latchbolt 16 or on the detent lever 22 causing them to seek the unlatched and released positions thereof respectively but rather, with frame 12 located in a generally vertical transverse plane of body 2, the centers of mass of the two parts are located with respect to the pivot centers thereof at studs 14 and 24 such that they seek these positions by the influence of gravity. It is to be appreciated also that following release of latch 10, a closing movement on deck lid 10 causing clockwise rotation of latchbolt 16 by striker 18 enables a cam projection 56 on the bolt to engage a surface 58 on detent lever 22 causing the latter to rotate counterclockwise against gravity to its detenting position. Once reaching this position and assuming that switch 48 is not closed, the magnetic attraction of magnet 34 with core 40 holds this latched condition of the parts in the fully lowered position of the deck lid, whereupon a repeat releasing operation involving the coil 42 may be accomplished.

It is to be appreciated that the angle of formation of shoulders 28 and 30 discussed hereinabove may be selected for a desired amount of cam out force on the detent lever 22 in accordance with the particular conditions involved in different vehicle bodies and with different seal strip pressures encountered in deck lid installations. For a given cam out force component, the permanent magnet 34 is of course selected for sufficiently greater strength as to not only overcome the cam out force but also hold the bolt 16 latched during rather severe inertia conditions during rough road travel or the like. The coil 42 may be selected of such size as to provide only such neutralizing magnetic force in core 40 as to permit the cam out force component urging shoulders 28 and 30 apart to overcome magnet 34, the cam out force also of course being slightly aided by the gravitational tendency in bolt 16 and detent lever 22 toward released condition.

Having thus described the invention what is claimed is:

1. A remotely controllable vehicle-closure latch comprising a striker adapted to be mounted on one of a pair of relatively moveable vehicle body members, a latch bolt adapted to be rotatably mounted on the other of the body members for movement between a latched position in engagement with said striker and an unlatched position, a moveable detent member engageable with said bolt to hold the same in the latched position thereof, said bolt and said detent member including cam out detent shoulders formed to provide a substantial force component effective to cam said detent member out of engagement with said bolt upon forced rotation of the latter from the latched to the unlatched position thereof, magnet

means magnetically operative to hold said detent member in engagement with said bolt in opposition to said cam out force component, and means selectively remotely operable to neutralize said magnet means to permit release of said detent member from said bolt under said cam out force component.

2. A remotely controllable vehicle-closure latch comprising a striker adapted to be mounted on one of a pair of relatively moveable vehicle body members, a latchbolt adapted to be rotatably mounted on the other of the body members for movement between a latched position in engagement with said striker and an unlatched position, a moveable detent member engageable with said bolt to hold the same in the latched position thereof, said bolt and said detent member including cam out detent shoulders formed to provide a substantial force component effective to cam said detent member out of engagement with said bolt upon forced rotation of the latter from the latched to the unlatched position thereof, permanent magnet means magnetically operative to hold said detent member in engagement with said bolt in opposition to said cam out force component, and electromagnet means selectively remotely operable to neutralize said magnet means to permit release of said detent member from said bolt under said cam out force component.

3. A remotely controllable vehicle-closure latch comprising a striker adapted to be mounted on one of a pair of relatively moveable vehicle body members, a latch frame adapted to be mounted on the other of said members, a latch bolt rotatably mounted on said frame for movement between a latched position in engagement with said striker and an unlatched position, a detent lever mounted on said frame for movement between a detenting position engageable with said bolt to hold the same in the latched position thereof and a released position, said bolt and said detent lever including cam out detent shoulders formed to provide a substantial force component effective to cam said detent lever out of engagement with said bolt upon forced rotation of the latter from the latched to the unlatched position thereof, a permanent magnet fixed to said detent lever, an electromagnet fixed to said frame proximate said permanent magnet and including a soft iron core and a magnetizing electrical coil arranged relative to the poles of said permanent magnet to cause magnetic repulsion between said permanent magnet and said core upon energization of said coil, the attraction between said permanent magnet and said core of said electromagnet being operative to hold said detent lever in the detenting position thereof in opposition to said cam out force component, and means for selectively energizing said coil to permit release of said detent lever from said bolt under said cam out force component.

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