

[54] CLOSURE LATCH ASSEMBLY

[75] Inventor: Howard D. Hester, Romeo, Mich.

[73] Assignee: General Motors Corporation,
Detroit, Mich.

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70/421, 422

[56] References Cited

UNITED STATES PATENTS

1,398,642 11/1921 Lewis 70/1.5
3,597,949 8/1971 Nigrelli 70/422

FOREIGN PATENTS OR APPLICATIONS

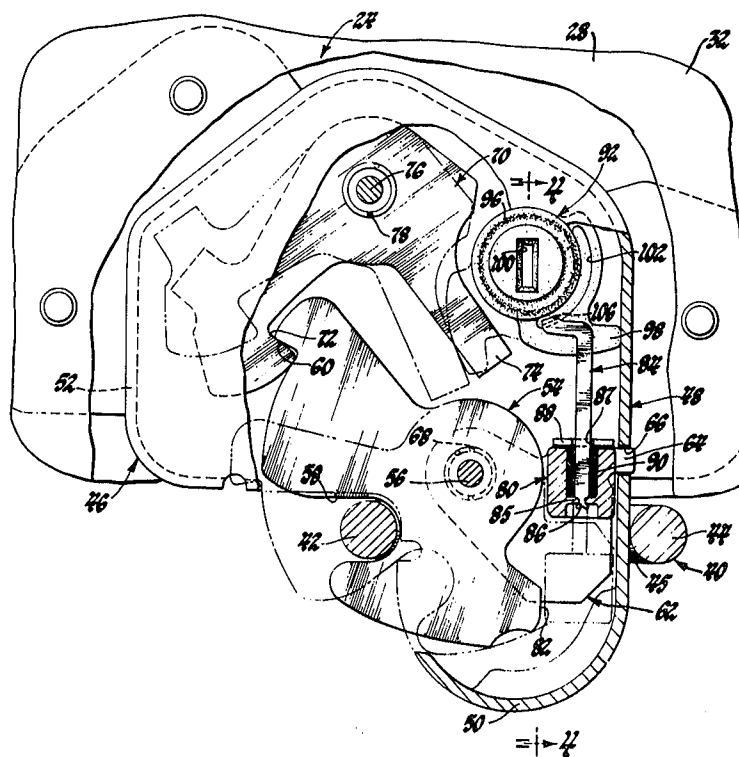
735,148 1954 United Kingdom 70/1.5

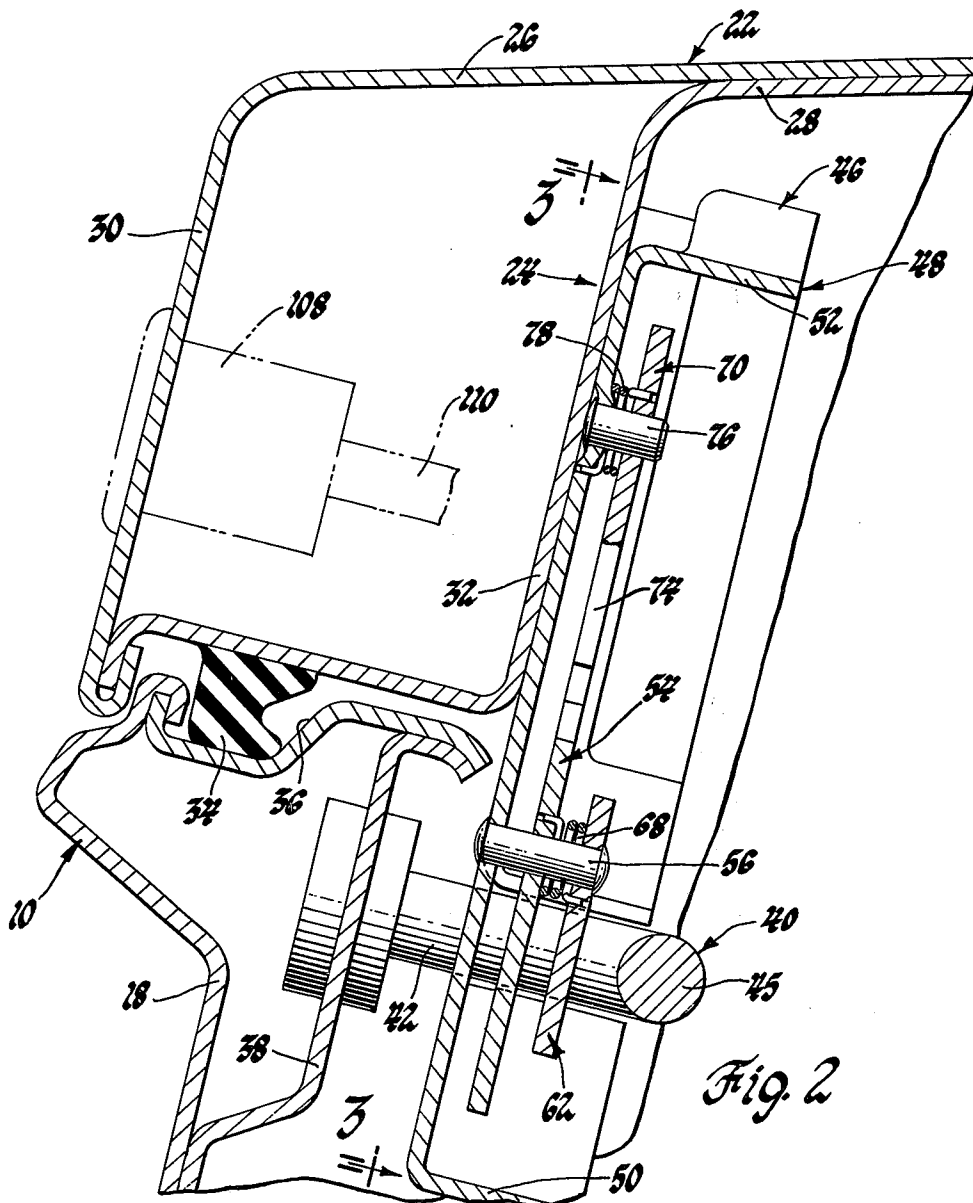
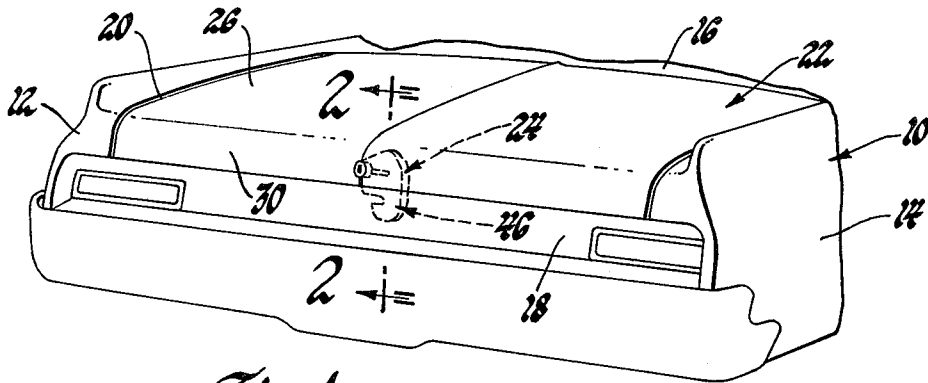
Primary Examiner—Robert L. Wolfe
Attorney, Agent, or Firm—Saul Schwartz

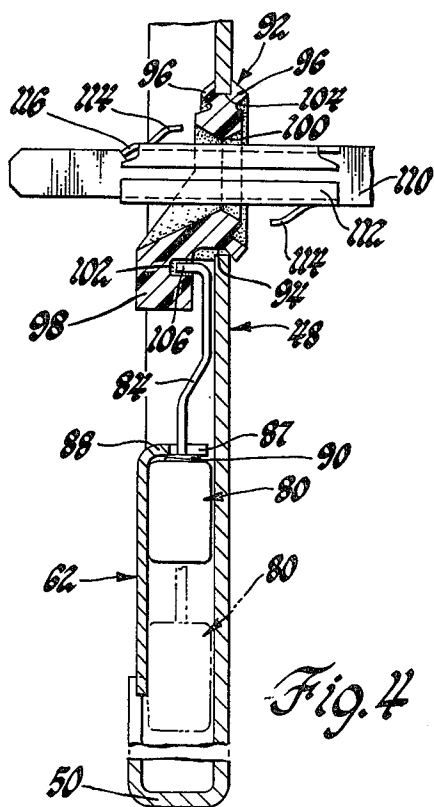
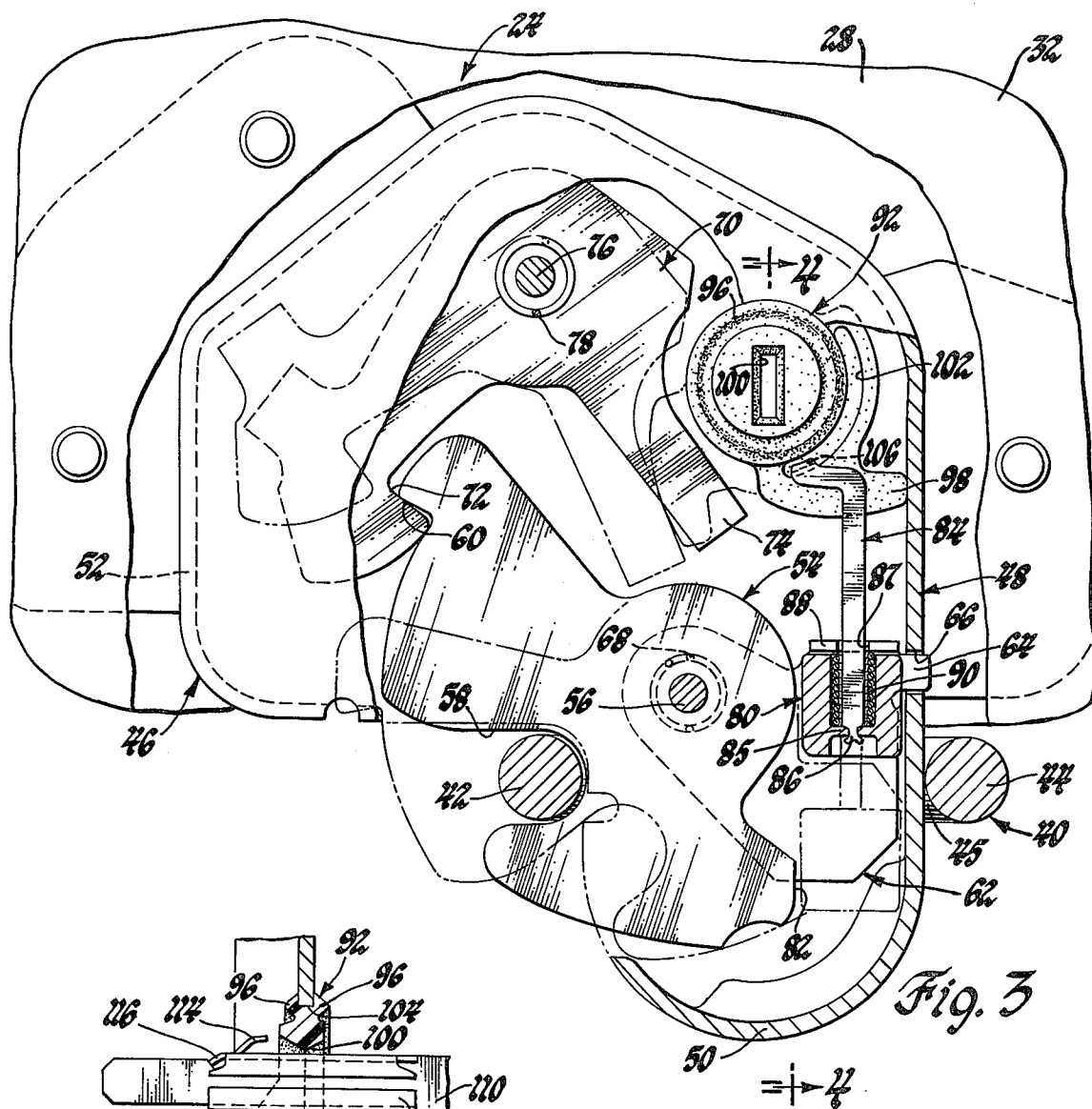
[57] ABSTRACT

A latch assembly particularly suited for automobile deck lid applications, including a latch bolt, a detent lever, a cam for actuating the detent lever rotatable on a frame of the latch assembly by a key shaft connected to a cylinder lock on the deck lid, a blocking member slidable on the frame between a blocking position and a non-blocking position, and a link disposed between the cam and the blocking member for maintaining the latter in the non-blocking position. When the cylinder lock is forcibly removed from the deck lid a clip on the key shaft forces the cam member away from the frame so that the link holding the blocking member is released thereby to permit spring-biased movement of the blocking member to the blocking position wherein movement of the latch bolt to an unlatched position is foreclosed.

3 Claims, 4 Drawing Figures







CLOSURE LATCH ASSEMBLY

This invention relates generally to latch assemblies for vehicle closures and more particularly to a novel combination of elements within such an assembly which renders the latch assembly inoperative under certain conditions corresponding to attempted unauthorized manipulation in a particular mode.

The primary feature of this invention is that it provides a new and improved closure latch assembly particularly adapted for automotive deck lid applications which incorporates structural elements for thwarting a particular mode of unauthorized manipulation of the latch assembly. Another feature of this invention is that it provides a new and improved closure latch assembly for the deck lid of an automobile wherein a cylinder lock is disposed on an outer panel of the deck lid and connects a latching portion of the latch assembly through a key shaft rotatable by the lock to effect releasing actuation of the latching portion, the latching portion incorporating a plurality of structural elements for automatically foreclosing releasing actuation in the event that the key shaft experiences extreme displacement normally associated with unauthorized removal of the lock cylinder. Yet another feature of this invention resides in the provision in the latching portion of the latch assembly of a blocking member biased toward a blocking position preventing releasing actuation of the latching portion but held in a non-blocking position by a link responsive to extreme displacement of the key shaft so that upon such extreme displacement the link becomes inoperative to restrain the blocking member. A still further feature of this invention resides in the provision in the latching portion of the latch assembly of a cam element slidably receiving the key shaft and rotatable by the latter for effecting releasing actuation of the latching portion, the cam member being releasably supported on a frame of the latching portion and including an arcuate slot which restrains the link holding the blocking member in the non-blocking position except when extreme displacement of the key shaft forces release of the cam member from the frame.

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

FIG. 1 is a fragmentary perspective view of the rear portion of an automobile vehicle body incorporating a closure latch assembly according to this invention;

FIG. 2 is an enlarged sectional view taken generally along the plane indicated by lines 2—2 in FIG. 1;

FIG. 3 is a view taken generally along the plane indicated by lines 3—3 in FIG. 2; and

FIG. 4 is a sectional view taken generally along the plane indicated by lines 4—4 in FIG. 3.

Referring now to the drawings, FIG. 1 depicts the rear portion of an automobile vehicle body designated generally 10, the body including a left rear quarter panel structure 12 and a right rear quarter panel structure 14. Generally at the belt line of the vehicle the quarter panel structures 12 and 14 are interconnected by a horizontal panel 16. Below the belt line and generally at the rearward end of the body, the quarter panel structures 12 and 14 are interconnected by a vertically oriented, transversely disposed sill panel 18. The quarter panel structures, the horizontal panel 16, and the sill panel 18 cooperate in defining a generally rectangular opening 20 for the cargo compartment of the vehicle body, not shown. The opening 20 is closed in a con-

ventional manner by a closure or the deck lid 22 supported on the body at the horizontal panel 16 by a conventional hinge and counterbalance arrangement, not shown. The deck lid 22 is pivotable relative to the body between a closed position disposed in the opening 20, FIG. 1, and an open position, not shown, exposing the cargo compartment. The deck lid is releasably maintained in the closed position by a closure latch assembly according to this invention and designated generally 24.

Referring to FIGS. 1 and 2, the deck lid 22 includes an outer panel 26 and an inner panel 28 rigidly attached to the outer panel by conventional fastening techniques. At the rearward end of the deck lid the outer panel includes a generally vertically oriented portion 30 and the inner panel 28 includes a similar vertically oriented portion 32 disposed in forwardly spaced relationship to the vertical portion 30. A weather seal 34 is rigidly attached to the deck lid 22 adjacent the lower marginal edge of the vertical portion 30 and in the closed position of the deck lid sealingly engages a horizontal trough 36 rigidly attached to the sill panel 18 and rigidified inboard of the latter by a brace panel 38.

As seen best in FIGS. 2 and 3, the closure latch assembly 24 includes a U-shaped striker 40 rigidly attached to the brace panel 38 and projecting forwardly therefrom, the striker including a pair of parallel, generally longitudinally extending legs 42 and 44 interconnected by a cross bar 45. The closure latch assembly 24 further includes a latching portion 46, the latching portion including a frame 48 defining a downwardly projecting pilot portion 50. An integral flange 52 extends substantially completely around the periphery of the frame 48. The frame is rigidly attached to the vertical portion 32 of the inner panel 28 by conventional means, not shown, such that in the closed position of the deck lid the pilot portion 50 of the frame projects between the legs 42 and 44 of the striker 40, FIG. 3.

As seen best in FIGS. 2 and 3, the latching portion 46 further includes a fork-type latch bolt 54 pivotally supported on a rivet 56 projecting forwardly from the frame 48, the latch bolt defining a mouth portion 58 and a detent shoulder 60. A guide plate 62 is rigidly supported on the distal end of the rivet 56 and includes a tab 64 projecting into a corresponding aperture 66 in the flange 52 of the frame, the rivet and the tab cooperating in rigidly supporting the guide plate with respect to the frame 48. A torsion spring 68 disposed around the rivet 56 bears against the guide plate and against the latch bolt 54 thereby to bias the latter for rotation in a counterclockwise direction, FIG. 3, to an unlatched position, shown in broken lines in FIG. 3, corresponding to the open position of the deck lid 22. As the deck lid is brought to the closed position, the mouth portion 58 of the latch bolt receives the leg 42 of the striker 40 and is caused by the leg 42 to pivot from the unlatched position to a latched position, shown in solid lines in FIG. 3, corresponding to the closed position of the deck lid.

Referring again to FIGS. 2 and 3, a detent lever 70 including a retaining shoulder 72 and an operating arm 74 is supported on a rivet 76 projecting from the frame 48 for pivotal movement between a detenting position and a releasing position, shown respectively in solid and broken lines in FIG. 3. A torsion spring 78 bears against the frame 48 and the detent lever for biasing the latter toward the detenting position. When the latch

bolt is in the latched position and the detent lever is in the detenting position, the retaining shoulder 72 bears against the detent shoulder 60 for preventing movement of the latch bolt to the unlatched position. When the detent lever is moved to the releasing position, the retaining shoulder 72 is disposed remote from the detent shoulder 60 so that the latch bolt is permitted free movement to the unlatched position.

Referring particularly now to FIGS. 3 and 4, a blocking member 80 is disposed between the frame 48 and the guide plate 62 for generally vertical sliding movement in the plane of the latch bolt 54 between a non-blocking position and a blocking position, shown respectively in solid and broken lines in FIGS. 3 and 4. When the latch bolt is in the latched position and the blocking member 80 is in the blocking position, the latter is disposed adjacent a shoulder 82 on the former to effect interference with the latch bolt for preventing movement of the latter to the unlatched position. Conversely, when the blocking member is in the non-blocking position, the latch bolt is permitted free and unobstructed movement between the latched and unlatched positions.

A link 84 has one end staked to a web portion 85 of the blocking member 80 at 86 and projects vertically through a slot 87 in a flange portion 88 of the guide plate 62. A spring 90 disposed around the link 84 bears at one end against the web portion 85 and at the other end against the flange portion 88 of the guide plate for biasing the blocking member toward the blocking position.

As seen best in FIGS. 3 and 4, the latching portion 46 further includes a cam member 92 having a cylindrical bearing surface 94 bounded on opposite sides by a pair of flexible annular lips 96. The cam member 92 further includes a contact arm 98, a key slot 100 aligned on the axis of the cylindrical bearing surface 94, and a retaining slot 102 disposed in a circular arc about the axis of the bearing surface 94. The cam member 92 is supported on the frame 48 within a circular aperture 104 of the latter with the bearing surface 94 of the cam member engaging the inside surface of the aperture and with the lips 96 disposed on opposite sides of the frame. The cam member is thus supported on the frame for rotary movement between a first position, FIG. 3, wherein the contact arm 98 is disposed remote from the operating arm 74 of the detent lever and a second position, not shown, wherein the contact arm 98 engages the operating arm 74 for the purpose of pivoting the detent lever from the detenting position to the releasing position. The distal end of the link 84 includes a hook portion 106 which is received within the retaining slot 102 between the cam member and the frame 48, FIG. 4. The length of the link 84 is predetermined to insure that when the hook portion 106 is disposed in the retaining slot 102 the blocking member 80 is maintained in the non-blocking position as shown in solid lines in FIG. 3.

Referring particularly to FIGS. 2 and 4, a conventional cylinder lock 108 is rigidly attached to the vertical portion 30 of the outer panel 26 in substantial alignment with the key slot 100 in the cam member 92. The cylinder lock includes a rotatable barrel portion, not shown, to which is attached a key shaft 110 having a cross-sectional configuration corresponding to the cross-sectional configuration of the key slot 100. The key shaft projects through an appropriate aperture in

the vertical portion 32 of the inner panel 28 and is slidably received within the key slot 100 so that rotation of the barrel portion of the cylinder lock 108 effects concurrent rotation of the cam member 92. A clip 112 having a pair of tangs 114 is disposed around the key shaft 110 and projects through the key slot 100 in the cam member, the tangs 114 being disposed on opposite sides of the cam member. The clip 112 is restrained against the longitudinal movement relative to the key shaft by spring fingers projecting into appropriate grooves in the key shaft, only one spring finger 116 being shown in FIG. 4.

Describing now the operation of the closure latch assembly 24, when the deck lid is in the closed and latched condition, the component elements of the latching portion 46 assume the relative positions shown in solid lines in FIGS. 3 and 4. When it is desired to release the deck lid for movement to the open position, an appropriate key is inserted in the cylinder lock and rotated to effect clockwise rotation, FIG. 3, of the barrel portion and the cam member 92 from the first position to the second position. Accordingly, the detent lever is engaged by the contact arm 98 and pivoted from the detenting to the releasing position, thereby allowing movement of the latch bolt from the latched to the unlatched position simultaneously with movement of the deck lid from the closed to the open position. During clockwise rotation of the cam member the hook portion 106 on the link 84 traverses the length of the retaining slot 102, the slot simultaneously retaining the link in the position of the latter corresponding to the non-blocking position of the blocking member 80. After the deck lid is released, the key is rotated back to its original position and removed, thereby bringing the cam member 92 back to the first position, FIG. 3. When the deck lid is closed, the leg 42 of the striker 40 causes the latch bolt to pivot from the unlatched to the latched position, during which movement the detent lever is cammed by the latch bolt from the detenting position. The detent lever returns to the detenting position under the urging of spring 78 as the detent shoulder 60 passes beneath the retaining shoulder 72.

One mode of unauthorized manipulation of the closure latch assembly contemplates forceable removal of the cylinder lock 108 and the key shaft 110 followed by rotation of the exposed cam member by an appropriate tool, a screw driver for example. The first result of this mode of unauthorized manipulation is extreme longitudinal movement of the key shaft. That is, if the cylinder lock is pulled from the outer panel 26 of the deck lid, the key shaft is withdrawn from the cam member. Similarly, pushing the cylinder lock behind the outer panel causes the key shaft to penetrate further into the key slot. Since the clip 112 is rigidly attached to the key shaft, this extreme longitudinal movement of the shaft effects engagement between one or the other of the tangs 114 and the cam member. After such engagement, the cam member moves as a unit with the clip 112 and the key shaft so that continued extreme longitudinal movement of the key shaft causes deformation of the annular lips 96 and subsequent release of the cam member from the frame 48. With the cam member released from the frame the restraint provided by the link 84 is removed and the spring 90 immediately projects the blocking member 80 to the block position wherein movement of the latch bolt 54 to the unlatched position is foreclosed. It will thus be apparent that after

the cylinder lock and the key shaft are forcibly removed, it is impossible to effect releasing actuation of the latching portion 46 by means of a tool inserted for the purpose of rotating the cam member.

Having thus described the invention, what is claimed is:

1. In a closure latch assembly including a frame, latch bolt means supported on said frame for movement between a latched position and an unlatched position, detent means supported on said frame for movement between a detenting position engaging said latch bolt means in the latched position of the latter and maintaining said latch bolt means in the latched position and a releasing position remote from said latch bolt means permitting movement of the latter to the releasing position, the combination comprising, a cam member, means supporting said cam member on said frame for movement in a first mode between a first position remote from said detent lever and a second position engaging said detent lever and moving the latter to the releasing position in response to a predetermined actuating force input and for independent movement in a second mode in response to a force input corresponding to one mode of unauthorized manipulation of said closure latch assembly, a blocking member, means supporting said blocking member on said frame for movement between a non-blocking position remote from said latch bolt means and a blocking position preventing movement of said latch bolt means to the unlatched position, means continuously urging said blocking member to the blocking position, link means attached to said blocking member and movable as a unit therewith, and link retainer means connected to said link means and to said cam member for movement as a unit with the latter, said link retainer means maintaining said link means in a position corresponding to the non-blocking position of said blocking member during movement of said cam means in the first mode but releasing said link means in response to movement of said cam means in the second mode thereby to permit movement of said blocking member to the blocking position.

2. In a closure latch assembly including a frame, latch bolt means supported on said frame for movement between a latched position and an unlatched position, detent means supported on said frame for movement between a detenting position engaging said latch bolt means in the latched position of the latter and maintaining said latch bolt means in the latched position and a releasing position remote from said latch bolt means permitting movement of the latter to the releasing position, the combination comprising, a cam member, means supporting said cam member on said frame for rotation in a first mode between a first position remote from said detent lever and a second position engaging said detent lever and moving the latter to the releasing position in response to a rotary actuating input and for bodily shiftable movement effecting separation from said frame in a second mode in response to a force input corresponding to one mode of unauthorized manipulation of said closure latch assembly, a blocking member, means supporting said blocking member on said frame for bodily shiftable movement between a non-blocking position remote from said latch bolt means and a blocking position preventing movement of said latch bolt means to the unlatched position, means continuously urging said blocking member to the

blocking position, a link, means attaching a first end of said link to said blocking member for bodily shiftable movement as a unit with the latter, means on said cam member defining a link retaining slot disposed in an arc about the center of rotation of said cam member, and means supporting a second end of said link in said retaining slot for sliding movement along said slot during rotation of said cam member in the first mode and for release from said slot in response to movement of said cam member in the second mode thereby to permit movement of said blocking member to the blocking position, said retaining slot maintaining said link in a position corresponding to the non-blocking position of said blocking member during rotation of said cam member in the first mode.

3. In a latch assembly for a vehicle closure including lock means disposed on an outer panel of said closure, a key shaft connected to said lock means and rotatable thereby, a latch frame disposed on said closure inboard of said outer panel, a latch bolt supported on said frame for movement between a latched position and an unlatched position, a detent lever supported on said frame for movement between a detenting position engaging said latch bolt in the latched position of the latter and maintaining said latch bolt in the latched position and a releasing position remote from said latch bolt permitting movement of the latter to the releasing position, the combination comprising, a cam member having a cylindrical bearing surface bounded by a pair of flexible annular lips and including a key slot and a retaining slot extending in an arc about the center of said cylindrical bearing surface, means in said frame defining an aperture aligned on the longitudinal axis of said key shaft, said cam member bearing surface being disposed in said aperture with said annular lips situated on opposite sides of said frame so that cam member is supported on said frame for rotation in a first mode between a first position remote from said detent lever and a second position engaging and moving said detent lever to the releasing position in response to a rotary actuating input from said key shaft and for bodily shiftable movement effecting separation from said frame in a second mode in response to a force input corresponding to one mode of unauthorized manipulation of said latch assembly, clip means disposed on said key shaft for movement as a unit with the latter, said clip means and said key shaft being disposed in said key slot so that rotation of said key shaft effects rotation of said cam member in the first mode, means on said clip operative to prevent bodily shiftable movement of the latter relative to said cam member so that bodily shiftable movement of said key shaft effects movement of said cam member in the second mode, a blocking member supported on said frame for bodily shiftable movement between a non-blocking position remote from said latch bolt and a blocking position preventing movement of said latch bolt to the unlatched position, spring means continuously urging said blocking member to the blocking position, a link, means attaching a first end of said link to said blocking member for bodily shiftable movement as a unit with the latter, and means supporting a second end of said link in said cam member retaining slot for sliding movement along said slot during rotation of said cam member in the first mode and for release from said slot in response to movement of said cam member in the second mode thereby to permit movement of said blocking member to the blocking position, said retaining slot maintaining said link in a position corresponding to the non-blocking position of said blocking member during rotation of said cam member in the first mode.

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