United States Patent

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[54] **CLOSURE LATCH**
6 Claims, 5 Drawing Figs.

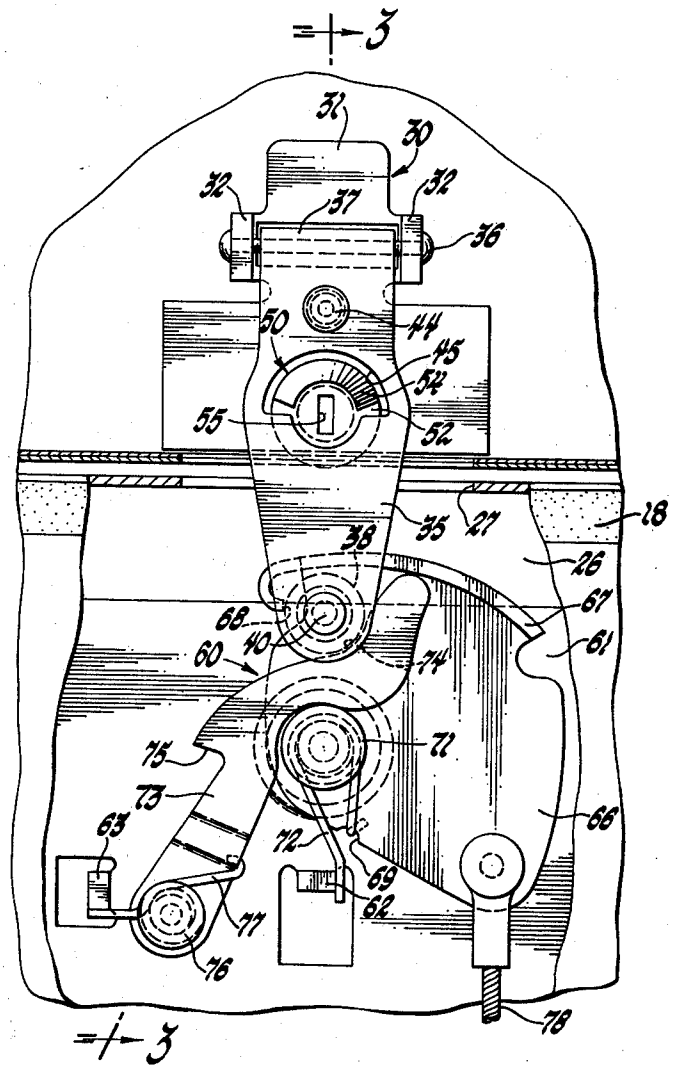
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[51] **Int. Cl.** **E05b 65/19,** E05c 3/30, E05c 11/00
[50] **Field of Search** 70/137, 142, 156, 157, 240; 292/201, 240, 304, 336, 341.13, 341.16, 341.17; 49/35

[56] **References Cited**
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ABSTRACT: A closure latch for a vehicle deck lid or the like includes a striker plate pivotally mounted on the deck lid for movement from a first position in operative relation to a latch member to a second position out of engagement with the latch member. The latch member, in the form of a wedge plate is pivotally connected to the vehicle body and power rotated during final closure to engage and pull down the striker plate thereby pulling the deck lid firmly against the vehicle body with a weather seal compressed therebetween.



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SHEET 1 OF 2

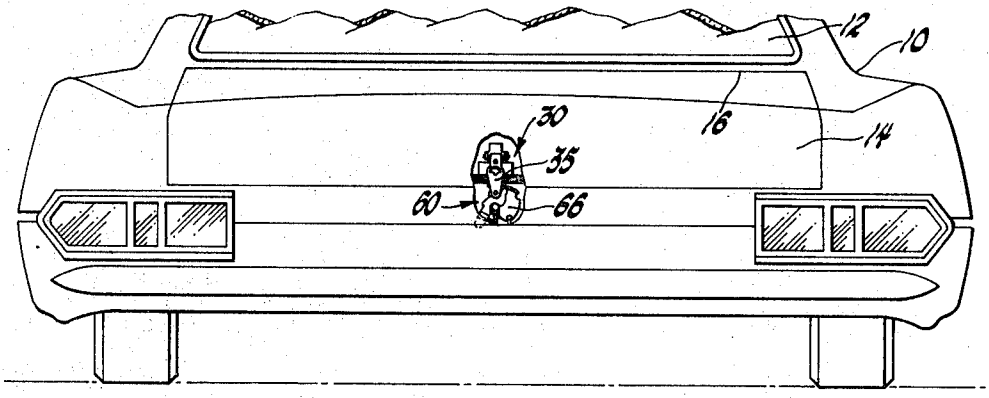


Fig. 1

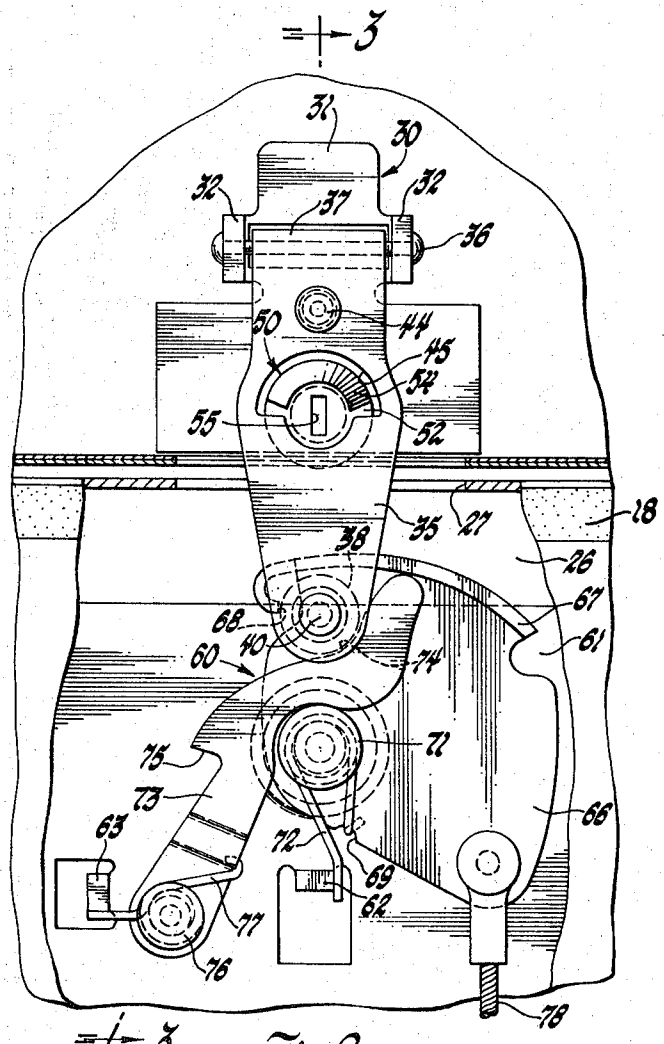


Fig. 2

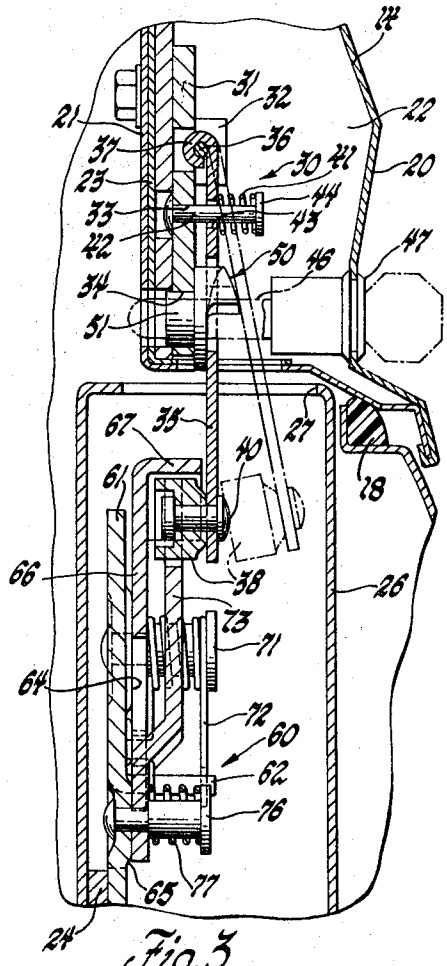


Fig. 3

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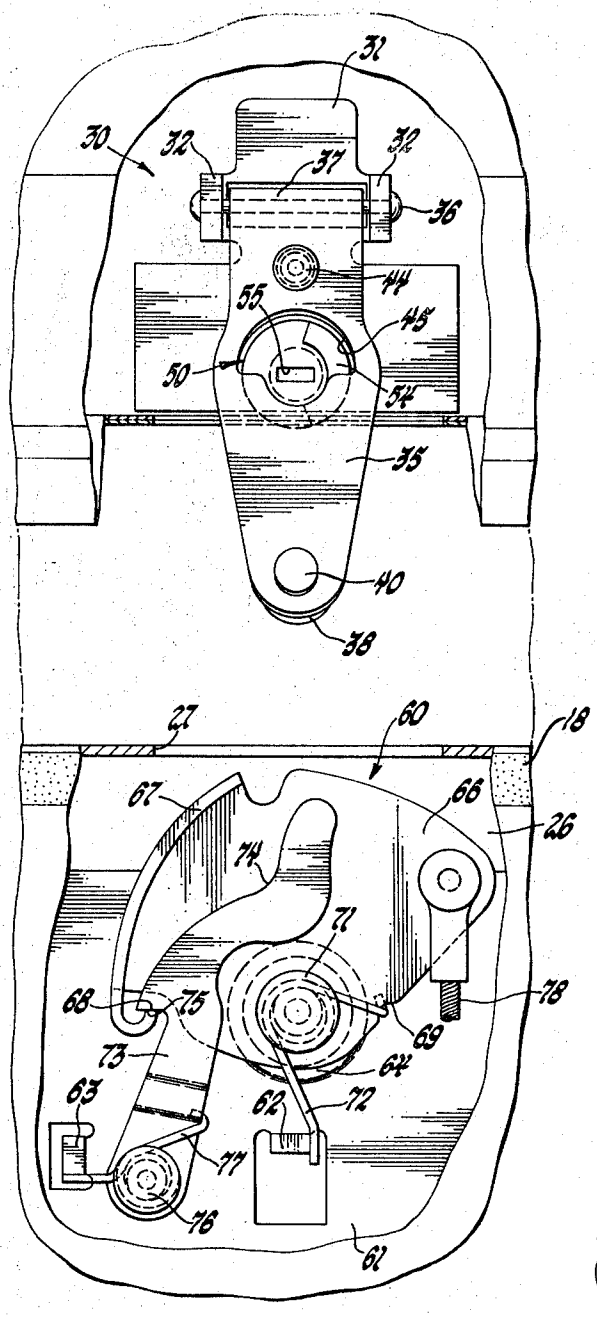


Fig. 4

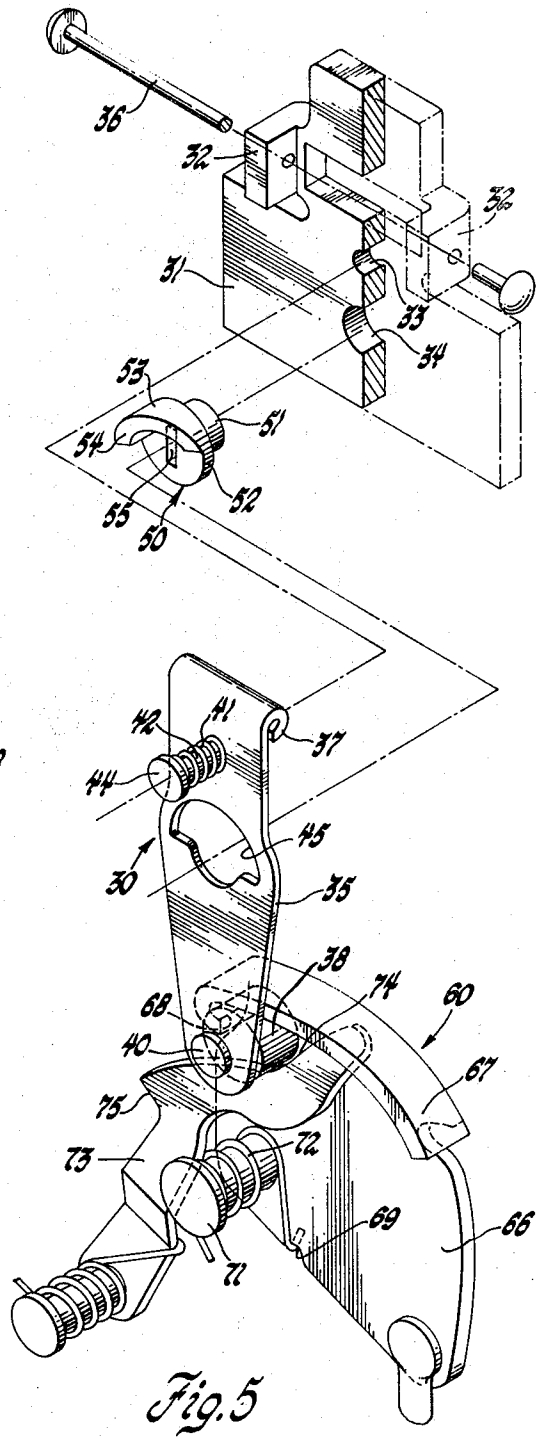


Fig. 5

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CLOSURE LATCH

This invention relates to closure latches and more particularly to an improved power assisted vehicle closure latch.

In various applications of closure latches, for example, in motor vehicle deck lids, it is desirable that the closure latch be capable of drawing the deck lid tightly shut assuring adequate compression of the weather seal in the form of a compressible sealing gasket. It is also desirable that this compression of the sealing gasket be accomplished without reliance upon the operator closing the deck lid with sufficient force to compress the sealing gasket. To eliminate problems in alignment of the striker on the lid with the latch on the vehicle body it is also desirable to have the closure latch operable in more than one locking holddown position.

Accordingly, the primary object of this invention is to improve closure latch mechanisms whereby the closure latch mechanism is power actuated for moving a vehicle deck lid or similar device from a partially closed position to a fully closed position with a sealing gasket effectively compressed between the deck lid and the vehicle body. Another object of this invention is to provide a closure latch mechanism operable in an infinite number of holddown positions.

According to the embodiment of the invention disclosed, these and other objects of the invention are achieved by providing a closure latch mechanism having a striker pivotally mounted, for example, to the deck lid for movement with the deck lid relative to the vehicle body. The striker plate is normally biased inboard to a first or locked position by a spring, but is movable outboard to a second or unlocked position by rotation of a cam actuated by a conventional key cylinder lock assembly. A latch member having a pulldown flange forming, in effect, a wedge plate is pivoted to the body of the vehicle to be in operative relation to the striker. A pull cable attached to a conventional source of intermittent power, such as, a conventional energy storage device, is connected to the latch member to rotate it to a latched position. When tension on the pull cable is released, a torsion spring rotates the latch member in an opposite direction to an unlatched position with the latch member then being normally held in this latter position by a spring biased detent. The spring biased detent is mounted adjacent to the latch member in position to be disengaged from the latch member by the striker as the deck lid is moved to a partially closed position relative to the vehicle body.

A more complete understanding of the invention will be had by referring to the following detailed description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a partial rear elevational view of a vehicle body embodying a closure latch according to this invention;

FIG. 2 is an enlarged view of a portion of FIG. 1 with the closure latch illustrated in a latched position;

FIG. 3 is a side view of the closure latch of FIG. 2;

FIG. 4 is a view similar to that of FIG. 2 but with the closure latch in an unlatched position; and

FIG. 5 is an exploded perspective view of the closure latch in a latched position.

Referring now particularly to FIG. 1 of the drawings, a vehicle body 10 includes a rear window 12 and a deck lid 14 which is swingably mounted at its forward edge 16 on the body 10 for movement between a closed position, as shown, and an open position, not shown, to open and close the rear deck compartment of the body. Preferably, the deck lid is swingably mounted by spaced conventional counterbalanced hinges, one of which has connected thereto an energy storage device of the type disclosed in U.S. Pat. No. 3,056,619 granted to Robert M. Fox and James D. Leslie on Oct. 2, 1962, which is operative to store operating energy as the deck lid moves from an open position toward the closed position.

Referring now particularly to FIG. 3, the deck lid 14 includes an outer panel 20 and an inner panel 21 suitably secured to each other to provide a housing 22 at the rear portion of the deck lid. Positioned within the housing 22 and suitably secured to the inner panel is a frame plate 23 for supporting the striker assembly 30 of the closure latch while

another frame plate 24 is secured at its lower end, not shown, to the channel member 26 of the vehicle body 10 for supporting the latch assembly 60 of the closure latch.

The striker assembly 30 includes a mounting plate 31 suitably secured to frame plate 23 for supporting the remaining elements of this assembly. The mounting plate 31 has a pair of spaced perforated ear portions 32 between which striker plate 35 is pivotably supported at its upper end by headed shaft 36. Headed shaft 36 extends through a perforated ear portion 32, then through the rolled-over upper end 37 of striker plate 35 and then through the remaining perforated ear portion 32. At its other end, the striker plate is provided with a striker which may be formed as an integral part thereof or, as shown, formed as a separate element, such as, striker roller 38 which is rotatably secured by stud 40 to the lower inboard end of the striker plate. The striker plate thus pivoted has its lower end extending through a suitable aperture in deck lid 14 to position striker roller 38 in operative relation to latch assembly 60 when deck lid 14 is moved toward the closed position relative to the vehicle body.

Striker plate 35 is normally biased inboard, that is, toward the front of the vehicle, by compression spring 41, but is movable outboard, toward rear of vehicle, to the position shown by the broken lines in FIG. 3 by clockwise rotation, as seen in FIG. 2, of cam 50. Compression spring 41 encircles the free end of spring stud 42 extending through bore 33 in the mounting plate and through the oversized aperture 43 in the striker plate 35, with one end of spring 41 abutting against the outboard face of the strike plate and the other end against washer 44 secured to the free end of the spring stud.

As best illustrated in FIGS. 3 and 5, cam 50 includes a cylindrical shaft portion 51 rotatably journaled in bearing aperture 34 in the mounting plate 31, a web portion 52 and formed integral with a part of the web portion 52 is a longitudinally extended cam portion 53 having an outboard cam surface 54 adapted to contact a portion of the inboard face of the striker plate adjacent to the cam relief aperture 45 formed in the striker plate 35 when in the unlocked position, and to protrude through the cam relief aperture when in the locked position, as described hereinafter.

The web portion 52 of the cam 50 is provided with a rectangular-shaped bore 55 substantially concentric with the shaft portion 51 which receives the complementary-shaped end of a shaft 46, shown schematically in FIG. 3. Shaft 46, which extends through the cam relief aperture 45 in the striker plate into engagement with cam 50, is part of a key cylinder lock assembly 47 mounted in the outer panel 20 of the deck lid. The key cylinder lock assembly, shown schematically in FIG. 3, is of a known type and upon insertion of a key therein, the shaft 46 can be turned to in turn rotate cam 50 in a clockwise direction as seen in FIG. 5.

The latch assembly 60 includes a baseplate 61 suitably secured to frame plate 24 between the depending legs of channel member 26 of the vehicle body in position to support the remaining operative elements of the latch assembly beneath the opening 27 in channel member 26.

A headed pivot stud 71 extending from the boss 64 of baseplate 61 rotatably mounts the latch member 66 for pivotal movement about the axis of this headed pivot stud. Latch member 66 is provided with an eccentric pulldown flange 67, adapted to cooperate with striker roller 38, terminating at its free end in a curved over portion to form a stop 68 for a purpose to be described.

As shown, the leading edge portion of the pulldown flange, that is, the portion which first engages the striker roller 38, is spaced a greater distance from the axis about which this assembly pivots than the trailing edge portion so that as the pulldown flange engages the striker roller, it is pulled toward the pivotal axis, the term pulldown being used relative to the arrangement shown.

The latch member is normally biased counterclockwise to an unlatched position relative to the striker, the position of the latch as seen in FIG. 4, by coiled torsion spring 72 and then

held in this position by detent hook **73**. Coiled torsion spring **72** surrounding headed pivot stud **71** has one leg engaging the tab **62** formed in baseplate **61** and the other leg engaging the notched portion **69** of latch **66**.

Detent hook **73** is pivotally secured at one end to the boss portion **65** of baseplate **61** by headed pivot stud **76** and, a coiled torsion spring **77** surrounding the headed pivot **76** has one leg thereof engaging tab **63** formed in baseplate **61** and the other leg engaging the detent hook to continuously bias the detent hook in a counterclockwise direction, as seen in FIG. **2**, about headed pivot stud **76**. The opposite end of the detent hook is provided with a curved follower portion **74** adapted to be engaged by striker roller **38** to effect rotation of the detent hook in a clockwise direction against the biasing action of coiled torsion spring **77**. Intermediate its ends, the hook includes a detent foot **75** adapted to engage stop **68** of latch member **66** to normally retain the latch member in the unlatched position shown in FIG. **4**.

Latch member **66** is rotated in clockwise direction, that is, from the position shown in FIG. **4** to the position shown in FIG. **2** against the biasing action of coiled torsion spring **72** by a pull cable **78** suitably connected at one end to the latch member **66** and at the other end to a suitable source of intermittent power, such as, an energy storage device, not shown, of the type disclosed in the aforementioned U.S. Pat. No. 3,056,619 to Fox et al.

Referring now particularly to FIGS. **2**, **3** and **4** of the drawings, the operation of the closure latch will be described and, particularly, the relationship of the various elements to each other from an unlatched position, as shown in FIG. **4**, to a latched position, as shown in FIG. **2**. Assuming that the deck lid is in the fully open position, when the operator begins to close the deck lid, energy will begin to be stored in the energy storage device to arm it for rotation of the latch member in a clockwise direction. Although energy is being stored in this device, it cannot be used to move the latch at this time because the latch member **66** is restrained in the position shown in FIG. **4** by engagement of detent **75** of detent hook **73** with the stop **68** of latch member **66**.

When the deck lid is lowered further to a substantially closed, but not fully closed position, the striker roller **38** on striker plate **35**, which is normally biased inboard, it being assumed that the key cylinder lock assembly is in locked position, will pass through the opening **27** in channel member **26** of the vehicle body and come into contact with the curved follower portion **74** of detent hook **73** causing the detent hook **73** to rotate clockwise against the biasing action of coiled torsion spring **77**. Further downward travel of the latching roller **38** will bring it beneath the lip of the pulldown flange **67** of latch member **66**, while at the same time causing sufficient clockwise rotation of detent hook **73** whereby detent **75** of the detent hook will become disengaged from latch member **66** freeing it to be rotated by the pull on pull cable **78**. By this time the energy storage device is fully armed with sufficient energy, sufficient to overcome the force of coiled compression spring **71** and to compress the conventional sealing gasket **18** between the deck lid **14** and the vehicle body **10**, and it now rotates the latch clockwise to the latched position shown in FIG. **2**. As the latch member rotates clockwise, the eccentric pulldown flange **67** engages the striker roller **38** pulling it and, therefore, the deck lid to a lower position, that is, to a closed position in which the sealing gasket **18** is compressed between the deck lid **14** and the vehicle body **10**. Striker roller **38** will ride down under pulldown flange **67** until it engages stop **68** defining the lower pulldown limit of the latch assembly. However, depending on the pull exerted by the energy storage device and the compression resistance of the sealing gasket, the latch may be rotated only part of the way so that the latching roller may come to rest at an infinite number of positions under the pulldown flange, but still be in position for release of the latch when desired, as described hereinafter. For this same reason, the alignment of these assemblies relative to each other is not too critical.

To release or unlatch this assembly, a key is inserted in the key cylinder assembly **47** and then turned clockwise to in turn rotate cam **50** via shaft **46** in a clockwise direction, as seen in FIG. **5**, whereby the cam surface **54** engages the inboard surface of the striker plate **35** to rotate it counterclockwise, as seen in FIG **3**, out from under the pulldown flange **67** to the position shown by broken lines in FIG. **3**, and thus allow the deck lid to rise toward the open position under the force exerted thereon by the conventional counterbalanced hinges, not shown. As the deck lid rises, the energy storage device is deactuated releasing the pull on pull cable **78** permitting coiled torsion spring **72** to rotate latch member **66** counterclockwise back to the unlatched position shown in FIG. **4**. At the same time, the detent hook **73**, also now disengaged from striker roller **38**, is free to be rotated counterclockwise by coiled torsion spring **77** until detent **75** engages stop **68** to again lock the latch member in the unlatched position of FIG. **4** preparatory to another latching cycle.

From the description and operation of latch member **66**, it is apparent that this element acts as a wedge plate to force the deck lid into closed contact relative to the vehicle body with a weather seal sandwiched therebetween.

I claim:

1. A closure latch for latching a closure member to a support member, the closure member being swingably mounted for movement between open and closed positions relative to the support member, the closure latch mechanism including:

striker means pivotally mounted on one of said members for movement from a locked position to an unlocked position;

a latch member pivotally mounted on said other member for movement about a pivot axis between an unlatched position and a latched position, said latch member when moving from said unlatched position to said latched position being adapted to engage said striker means when said striker means is in said locked position to pull said members into a closed position relative to each other;

lock control means connected to said striker means for moving said striker means between said locked position in which said striker means is positioned to be in operative relation to said latch member and said unlocked position in which said striker is in a position out of operative relation to said latch member;

detent means positioned to normally engage and hold said latch member in said unlatched position and to be engaged by said striker means when said striker means is in said locked position to release said latch member; and

actuator means connected to said latch member and connectable to a source of intermittent power for moving said latch member between said unlatched position and latched position.

2. A closure latch according to claim **1** wherein said lock control means includes:

bias means operatively connected to said striker means to normally bias said striker means to said locked position; and

key cylinder lock operated cam means operatively connected to said striker means to selectively pivot said striker means to said unlocked position.

3. A closure latch according to claim **1** wherein said striker means includes:

a rotatably supported striker roller, and wherein said striker means includes;

a rotatably supported striker roller, and wherein said latch member includes;

pulldown flange means positioned eccentrically of said pivot axis for engagement with said striker roller to force said striker means toward said pivot axis.

4. A closure mechanism for latching a closure member to a support member, the closure member being swingably mounted for movement between open and closed positions relative to the support member, the closure mechanism including:

striker means;

latch means;

said striker means being pivotally mounted on one of said members for movement about an axis from a locked position to an unlocked position in relation to said latch means;

biasing means connected to said striker means to normally bias said striker means to said locked position;

key cylinder lock controlled cam means operatively connectable to said striker means to rotate said striker means to said unlocked position;

said latch means being rotatably mounted on said other member for pivotal movement about an axis between an unlatched position and a latched position in a direction normal to the pivotal axis of said striker means, said latch means having eccentric flange means whereby as said latch means is moved from said unlatched position to said latched position said eccentric flange means engages said striker means when said striker means is in said locked position to move said members into a closed position relative to each other;

biased detent means positioned to normally engage and hold said latch means in said unlatched position and to be engaged by said striker means when said striker means is in said locked position to release said latch means for pivotal movement; and

actuator means connected to said latch means for moving said latch means between said unlatched position and said latched position.

5. A closure mechanism according to claim 4 wherein said actuator means includes:

bias means connected to said latch means to normally bias said latch means to said unlatched position; and

means connected to said latch means and connectable to a source of intermittent power to pivot said latch means to said latched position when said biased detent means is disengaged from said latch means.

6. A closure latch for latching a closure member to a support member, the closure member being swingably mounted for movement between open and closed positions relative to the support member, the closure latch mechanism including:

striker means pivotally mounted on said closure member for movement about an axis parallel to the axis of the swinging movement of said closure member from a locked position to an unlocked position;

lock control means connected to said striker means for selectively moving said striker means between said locked position and said unlocked position;

latch means pivotally mounted on said support member for pivotal movement about an axis at right angles to the pivotal axis of said striker means from an unlatched position, to a latched position, said latch means when moving from said unlatched position to said latched position engaging said striker means when said striker means is in the said locked position to move said closure member into a closed position relative to the support member;

biased detent means positioned to normally engage and hold said latch means in said unlatched position and to be engaged by said striker means when said striker means is in said locked position to release said latch means;

bias means connected to said latch means to normally bias said latch means to said unlatched position; and

means connected to said latch means and connectable to a source of intermittent power to pivot a said latch means to said latched position when said biased detent means is disengaged from said latch means.