United States Patent

Zaydel

[15] **3,666,307**

[45] **May 30, 1972**

[54] CLOSURE LATCH

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

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[21] Appl. No.: **86,097**

[52] **U.S. Cl.** **292/216,** 292/DIG. 27
[51] **Int. Cl.** **E05c 3/26**
[58] **Field of Search** .....292/216, 280, DIG. 26, DIG. 27

[56] **References Cited**

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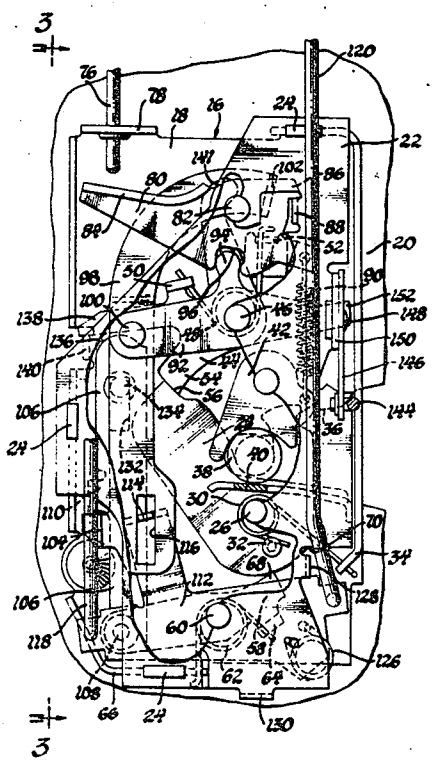
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[57] **ABSTRACT**

A vehicle body door lock includes an inverted fork bolt mounted on the lock frame for movement between latched and unlatched positions and primary and secondary detents mounted on the frame on generally diametrically opposite sides of the bolt pivot for movement between holding and released positions with respect to the bolt. Coaxially mounted with the primary detent is an operating lever which is connected to the outside push button through an intermediate push button lever. A generally J-shaped intermittent member is pivoted intermediate the ends thereof to a leg of the operating lever. The linear leg of the intermittent member mounts a tab movable between engaging and bypass positions with respect to a tab of a transfer link. One end of the link is pivoted to the secondary detent and the other end is engageable with the primary detent. The intermittent member is moved between unlocked and locked positions, respectively, corresponding to engaging and bypass positions of the intermittent member tab, by a locking lever coaxially mounted with the secondary detent and operable by a garnish button or key cylinder. The hook leg of the intermittent member includes a tab engageable by the primary detent to move the intermittent member from locked to unlocked positions upon movement of the detent by the bolt. If the outside push button is actuated prior to movement of the detent by the bolt the hook leg tab is moved out of the path of the primary detent. An inside remote handle is connected by a remote lever to the operating lever.

4 Claims, 5 Drawing Figures



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SHEET 1 OF 2

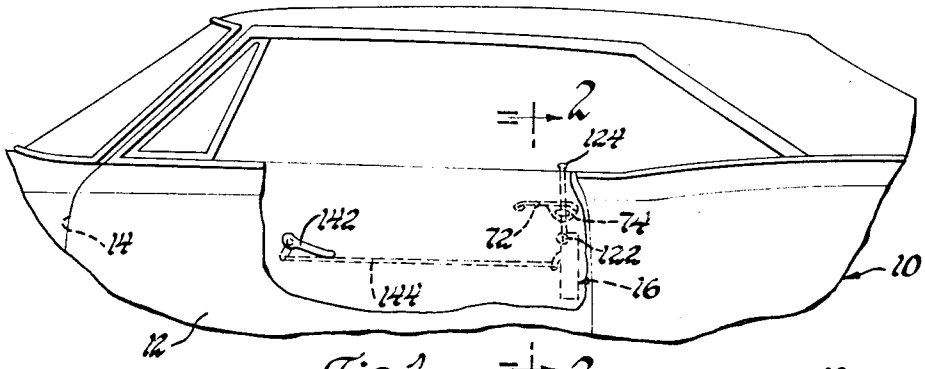


Fig. 1

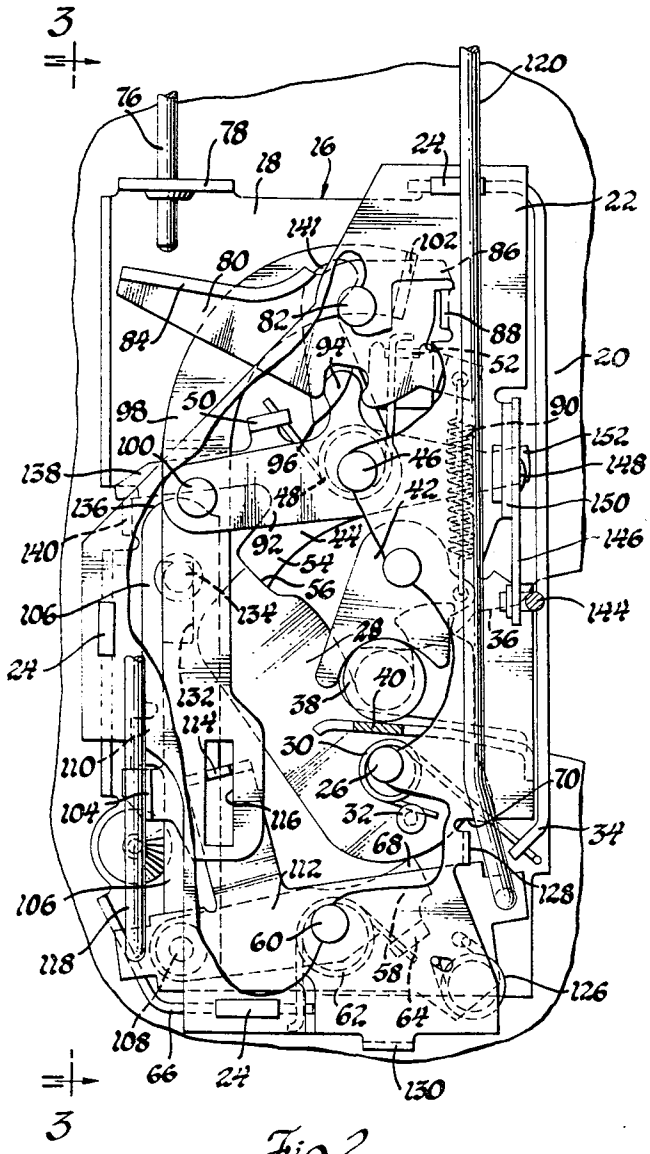


Fig. 2

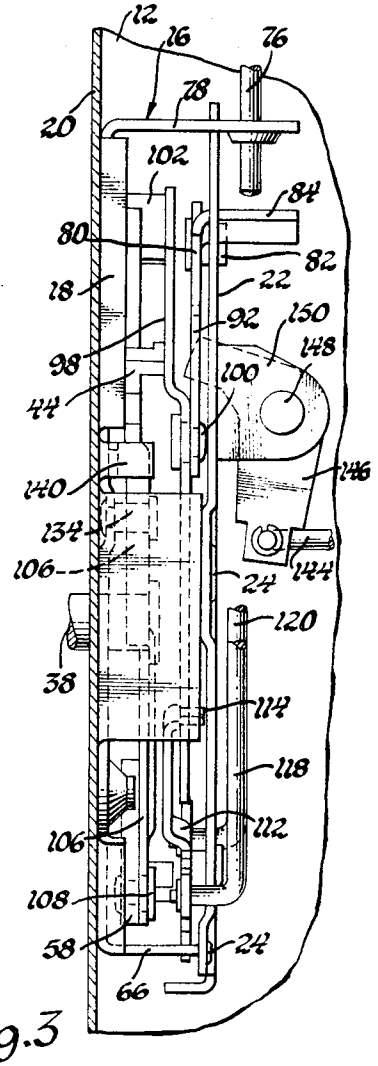


Fig. 3

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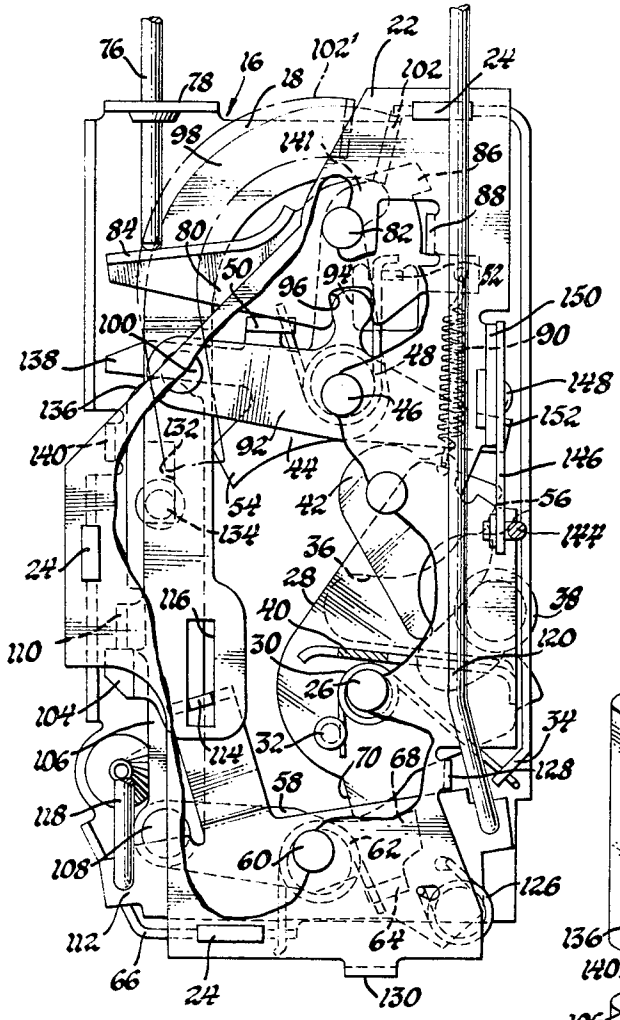


Fig. 4

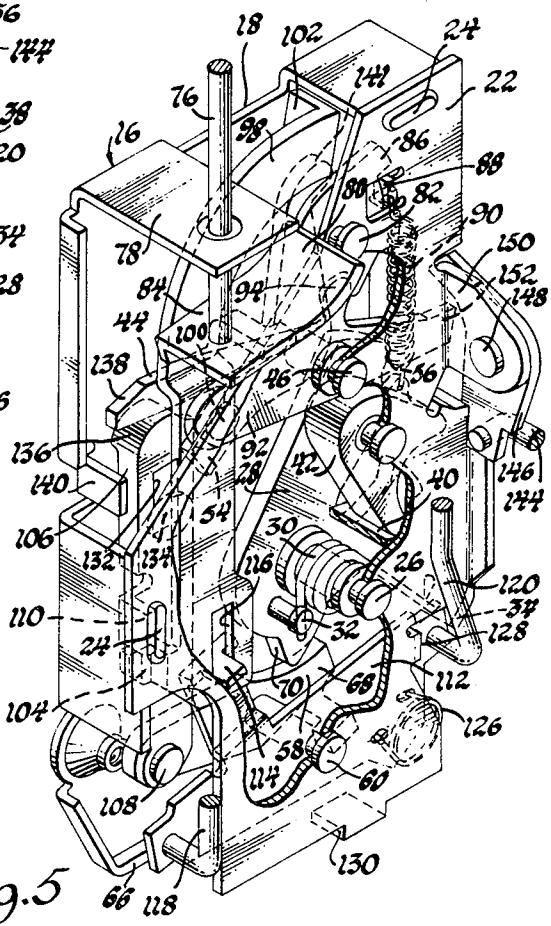


Fig. 5

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CLOSURE LATCH

This invention relates to double detent door locks and more particularly to double detent door locks of the type having an intermittent member for selectively coupling and uncoupling the outside operator and the detents.

The door lock of this invention is similar to that shown and described in Ser. No. 726,973 Arlauskas et al, filed May 6, 1968, now U.S. Pat. No. 3,545,800 issued Dec. 8, 1970 and assigned to the assignee of this invention. However, it differs from the above-noted lock in that it includes an elongated intermittent member having a linear leg extending alongside the inverted bolt and an arcuate leg extending generally transversely of the opening of the bolt throat. The member is pivoted intermediate the legs thereof to an operating member pivoted to the lock frame between the arcuate leg and bolt throat. The operating member is connected to the outside and inside operators. The linear leg of the intermittent member is movable between connecting and bypass positions with respect to the secondary detent upon movement of the intermittent member between unlocked and locked positions, respectively, by a conventionally controlled locking lever. The primary and secondary detents are interconnected for simultaneous movement to released position. The arcuate leg is positioned in the path of the primary detent, the locked position of the intermittent member so as to be engaged thereby to move the intermittent member to unlocked position upon movement of the detents by the bolt. The arcuate leg of the intermittent member can also belocated in bypass relationship to the primary detent should the outside operator be actuated prior to movement of the detents by the bolt.

One of the features of the door lock of this invention is that it includes an elongated intermittent member which partially surrounds the bolt and is pivotally supported intermediate the ends thereof on an operating member for movement therewith and movement independently thereof between locked and unlocked positions with respect to interconnected primary and secondary detents for the bolt. Another feature is that the intermittent member includes a linear leg extending alongside the bolt and an arcuate leg extending transversely of the bolt throat with the linear leg providing the connection between the intermittent member and one of the detents and the arcuate leg providing the connection between the intermittent member and the other detent for undogging purposes. A further feature is that the operating member for the intermittent member is coaxial with one of the detents and a locking lever for moving the intermittent member between locked and unlocked positions is coaxial with the other detent.

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

FIG. 1 is a partial side elevational view of a vehicle body embodying a door lock according to this invention;

FIG. 2 is an enlarged broken away view taken generally along the plane indicated by line 2—2 of FIG. 1;

FIG. 3 is a view taken generally along the plane indicated by line 3—3 of FIG. 2;

FIG. 4 is a view similar to FIG. 2 and showing the bolt moving to unlatched position; and

FIG. 5 is a broken away perspective view with the bolt in unlatched position.

Referring now particularly to FIG. 1 of the drawings, a vehicle body designated generally **10** includes a front door **12** which is swingably mounted adjacent its forward edge **14** on the body **10** for movement between a closed position as shown and an open position, not shown. Door **12** is held in closed position by a door lock designated generally **16** according to this invention.

As shown in FIGS. **2** through **5** of the drawings, the lock **16** includes a main frame **18** which fits against the inner surface of the lock pillar wall **20** of door **12** and is secured thereto in a conventional manner. An auxiliary frame **22** is located in laterally spaced relationship to the main frame **18** and secured thereto by a number of staked tabs **24** provided on various

lateral flanges of the frame **18**. Pivoted at **26** to the frames **18** and **22** is an inverted fork bolt **28**. A coil torsion spring **30** surrounds the pivot **26** and is hooked between a stud **32** of the bolt and a notched flange **34** of frame **18** to continuously bias bolt **28** clockwise from latched position, shown in FIG. **2**, to unlatched position, shown in FIGS. **4** and **5**. As indicated schematically in FIGS. **2** and **4**, the frame **18** is cut away at **36** and likewise the flange **34** is also cut away, not shown, to provide for entrance of a conventional headed striker pin **38** into the space between frames **18** and **22**. When the bolt is in latched position, the shank of the pin is conventionally received within the throat of the bolt **28** and the head of the pin is conventionally trapped between a ramp **40** and a pivoted shoe **42**.

A primary detent **44** is pivoted at **46** to the frames **18** and **22**. A coil torsion spring **48** surrounding the pin **46** is hooked between a notched tab **50** of the detent and a notched tab **52** of the frame **18** to continuously bias the detent counterclockwise as viewed in FIG. **2** and hold the detent foot **54** in engagement with a shoulder **56** provided on the inner edge of the inboard leg of the bolt **28**. A secondary detent **58** is pivoted at **60** to the frames **18** and **22** and is biased in a counterclockwise direction by a coil torsion spring **62** hooked between a notched lateral tab **64** of the secondary detent and a notched lateral flange **66** of the frame **18**. The detent foot **68** engages the bolt **28** at the base thereof and in spaced relationship to a shoulder **70** of the bolt. The engagement of the foot **68** and shoulder **70** defines the secondary latched position of the bolt **28**.

As shown in FIG. **1**, the door **12** includes a conventional outside door handle **72** which includes a conventional push button assembly **74**. As shown in the drawings, the push rod **76** of the push button assembly reciprocates vertically within a bushing in a lateral flange **78** of the frame **18**. A push button lever **80** is pivoted at **82** to the frame **22** and includes a lateral flange **84** which is adapted to be engaged by the push rod **76** to rotate the push button lever counterclockwise as viewed in FIGS. **2**, **4**, and **5**. Normally the push button lever is located as shown in FIG. **2** by the engagement of a leg **86** of the lever with a lateral tab **88** of frame **22** under the action of a tension spring **90** which interconnects another apertured leg of the push button lever and the shoe **42**.

An operating bellcrank lever **92** is coaxially pivoted at **46** with the primary detent and has an arcuately edged leg **94** thereof received within an opening **96** of the lever **80** to pivotally couple the push button lever and the operating lever. A generally J-shaped elongated intermittent member **98** is pivoted intermediate the ends thereof at **100** to the operating lever **92**. The curved or hook-shaped leg of the intermittent member includes a lateral tab or flange **102** providing an undogging abutment as will be further described, and the other generally linear leg includes an offset lateral flange **104** which is best shown in FIG. **5**.

A coupling link **106** is pivoted at **108** to the secondary detent **58** and includes a lateral flange **110** which overlies flange **104** of the intermittent member **98** when the intermittent member is in its coupled or unlocked position shown in FIG. **2**, as will be further explained.

A locking lever **112** is coaxially pivoted at **60** with the secondary detent **58** and includes a lateral tab **114** slidably received within a closed elongated slot **116** of the intermittent member to pivotally and slidably couple the locking lever and intermittent member. The locking lever is conventionally connected by shiftable rods **118** and **120** to a conventional outside key cylinder assembly **122** and garnish button **124**, respectively, shown in FIG. **1**.

The locking lever **112** and intermittent member **98** are shown in unlocked position in FIG. **2**, and it will be noted that in this position the flange **104** of the intermittent member underlies the flange **110** of the coupling link **106**. When the locking lever is moved to locked position, clockwise of its position shown, by actuation of either the garnish button or the key cylinder assembly, the intermittent member **98** is swung slightly counterclockwise about the pivot **100** to uncou-

pled or locked position. Flange **110** is now located in bypass position, or to the right of flange **104**, to thereby uncouple the intermittent member and the link **106**. The locking lever is selectively and alternately biased to either position by an over-center type coil torsion spring **126** hooked between the frame **22** and the lever. The engagement of the locking lever with lateral flanges **128** and **130** locates the locking lever in its unlocked and locked positions, respectively, under the action of spring **126**.

As best shown in FIG. **5**, the link **106** includes a closed elongated slot **132** which receives a headed pin **134** secured to the frame **18** to thereby guide vertical movement of the link **106**. Also as shown in FIG. **5**, the upper arcuately flanged end **136** of the link underlies a foot **138** of the primary detent **44**. Foot **138** seats against a tab **140** of frame **18** under the action of spring **48** to locate the primary detent **44** in holding or detented position as shown in FIG. **2**.

When the door **12** is in a closed position as shown in FIG. **1**, the bolt will be maintained in its fully latched position as shown in FIG. **2** by the engagement of foot **54** of the primary detent **44** with shoulder **56**. Should it be desired to open the door, the push button **74** is actuated to shift the rod **76** downwardly and thereby engage the rod with the flange **84** of the lever **80**. This will shift the lever **80** counterclockwise of the pivot **82** against the action of spring **90** and in turn rotate the lever **92** clockwise to bodily shift the intermittent member **98** upwardly from its position shown in FIG. **2**. The engagement of the flange **104** with the flange **110** will shift the link **106** upwardly to rotate the secondary detent **58** clockwise of pivot **60** to released position as foot **68** moves out of the path of shoulder **70** of bolt **28**. The engagement of the flanged end **136** of link **106** with the foot **138** of detent **44** rotates the primary detent clockwise to released position as foot **54** moves out of engagement with shoulder **56**. Bolt **28** can then rotate clockwise to unlatched position shown in FIG. **4**. Upon release of the push button **74**, the intermittent member returns to its position shown in FIG. **4** and the primary and secondary detents likewise return to their positions shown in FIG. **4** due to the engagement of the edge of foot **68** of the secondary detent **58** with the abutment of bolt **28** which provides shoulder **70**, as shown in FIG. **4**. Should the door **12** now be closed, the engagement of the shank of striker pin **38** with the inboard leg of the bolt **28** will rotate the bolt counterclockwise from its position shown in FIG. **4** to its position shown in FIG. **2**. During this movement, the secondary detent **58** rotates slightly clockwise of pivot **60** and then rotates counterclockwise when foot **68** passes shoulder **70**. The primary detent **44** likewise rotates slightly clockwise and then counterclockwise with the secondary detent to locate foot **54** in the path of the inboard leg of bolt **28**. The primary detent rotates clockwise independently of the secondary detent when foot **54** engages the inboard leg of the bolt and moves past such leg into engagement with the shoulder **56** to maintain the bolt in latched position as shown in FIG. **2**.

Should either the garnish button **124** or the key cylinder **122** be operated with the door in open position to move the intermittent member **98** to uncoupled position, tab **102** will be located as schematically indicated at **102'** in FIG. **4**. When the door is closed, the initial slightly clockwise movement of detent **44**, as previously set forth, will engage an upwardly extending leg **141** of the primary detent with the undogging tab **102** of the intermittent member to rotate the intermittent member **98** slightly clockwise of pivot **100** and thereby return the intermittent member to coupled position and the locking lever **112** to unlock position. Thus, automatic undogging is accomplished.

Keyless locking is accomplished by depression of the push button **74** as the door is closed to shift the tab **102** upwardly and out of the path of the detent leg **140** as the door is closed to thereby maintain the intermittent member **98** in uncoupled position.

A conventional inside remote handle assembly **142**, FIG. **1**, is connected by a shiftable rod **144** to one leg of an inside remote lever **146** pivoted at **148** on a lateral flange **150** of frame **22**. As shown best in FIG. **5**, the other leg of the inside remote lever overlies a leg **152** of the lever **92** so that actuation of the inside remote handle will release the bolt when the intermediate member **98** is in uncoupled position. Since the inside remote handle is connected to the secondary detent through the intermittent member, the position of the intermittent member controls both the coupling and uncoupling of the push button assembly **74** and the inside remote handle.

Thus, this invention provides an improved vehicle body door lock.

I claim:

1. In a vehicle body door lock having a lock frame, a fork bolt mounted on the frame for movement between latched and unlatched positions, primary and secondary detent means mounted on the frame for movement between holding and released positions with respect to the bolt to maintain the bolt in respective primary and secondary latched positions, and motion transferring means interconnecting the detent means for simultaneous movement of both to released position with respect to the bolt, the improvement comprising, an operating member movably mounted on the frame, an elongated intermittent member swingably mounted intermediate the ends thereof on the operating member for movement thereby and independently thereof between coupled and uncoupled positions, means adjacent one end of the intermittent member engageable with the motion transferring means in the coupled position of the intermittent member for actuating the motion transferring means upon movement of the intermittent member by the operating member, locking means for moving the intermittent member independently of the operating member between coupled position and uncoupled position, wherein the means on the intermittent member bypass the motion transferring means upon movement of the intermittent member by the operating member, and means adjacent the other end of the intermittent member engageable by means on one of the detent means upon movement of the one detent means by the bolt for moving the intermittent member from uncoupled to coupled position.

2. In a vehicle body door lock having a lock frame, a fork bolt mounted on the frame for movement between latched and unlatched positions, primary and secondary detent means pivotally mounted on the frame for movement between holding and released positions with respect to the bolt to maintain the bolt in respective primary and secondary latched positions, and motion transferring means interconnecting the detent means for simultaneous movement of both to released position with respect to the bolt, the improvement comprising, an operating member movably mounted on the frame, an elongated intermittent member swingably mounted intermediate the ends thereof on the operating member for movement thereby and independently thereof between coupled and uncoupled positions, the member including a generally linear leg extending in the general direction of the bolt throat and a generally arcuate leg extending transverse of the bolt throat, means on the linear leg engageable with the motion transferring means in the coupled position of the intermittent member for actuating the motion transferring means upon movement of the intermittent member by the operating member, locking means for moving the intermittent member independently of the operating member between coupled position and uncoupled position wherein the means on the linear leg bypass the motion transferring means upon movement of the intermittent member by the operating member, and means on the arcuate leg engageable by one of the detent means upon movement of the one detent means by the bolt for moving the intermittent member from uncoupled to coupled position.

3. In a vehicle body door lock having a lock frame, an inverted fork bolt mounted on the frame for movement between latched and unlatched positions, primary and secondary detent means pivotally mounted on the frame for movement between holding and released positions with respect to the bolt to maintain the bolt in respective primary and secondary

latched positions, and motion transferring means interconnecting the detent means for simultaneous movement of both to released position with respect to the bolt, the improvement comprising, an operating member movably mounted on the frame, an elongated generally J-shaped intermittent member swingably mounted intermediate the ends thereof on the operating member for movement thereby and independently thereof between coupled and uncoupled positions, the member including a generally linear leg located to one side of the bolt and extending in the general direction of the bolt throat and a generally hook shaped leg located to another side of the bolt and extending transversely of the bolt throat, means adjacent the free end of the linear leg engageable with the motion transferring means in the coupled position of the intermittent member for actuating the motion transferring means upon movement of the intermittent member by the operating member, locking means for moving the intermittent member independently of the operating member between coupled positions and uncoupled position, wherein the means on the linear leg bypass the motion transferring means upon movement of the intermittent member by the operating member, and means adjacent the free end of the hook shaped leg engageable by means on the primary detent means upon movement of the primary detent means by the bolt for moving the intermittent member from uncoupled to coupled position.

4. In a vehicle body door lock having a lock frame, an inverted fork bolt mounted on the frame for movement between latched and unlatched positions, primary and secondary detent means pivotally mounted on the frame respectively above and below the bolt for movement between holding and released positions with respect to the bolt to maintain the bolt in respective primary and secondary latched positions, and motion transferring means interconnecting the detent means for simultaneous movement of both to released position with respect to the bolt, the improvement comprising, an operating member movably mounted on the frame, an elongated intermittent member swingably mounted intermediate the ends thereof on the operating member for movement thereby and independently thereof between a coupled position and an uncoupled position, the member including a generally linear leg extending from the pivot thereof alongside the bolt and a generally arcuate leg extending from the pivot thereof above the bolt throat and the pivot of the primary detent, means adjacent one end of the linear leg engageable with the motion transferring means in the coupled position of the intermittent member for actuating the motion transferring means upon movement of the intermittent member by the operating member, locking means for moving the intermittent member independently of the operating member between coupled position and uncoupled position wherein the means on the linear leg bypass the motion transferring means upon movement of the intermittent member by the operating member, and means on the arcuate leg engageable by an upwardly extending arm of the primary detent means upon movement of the primary detent means by the bolt for moving the intermittent member from uncoupled to coupled position.

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