Jan. 14, 1969 R. E. SLATTERY 3,421,785

DOOR LATCH FOR AUTOMOTIVE VEHICLES

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Fig. 1

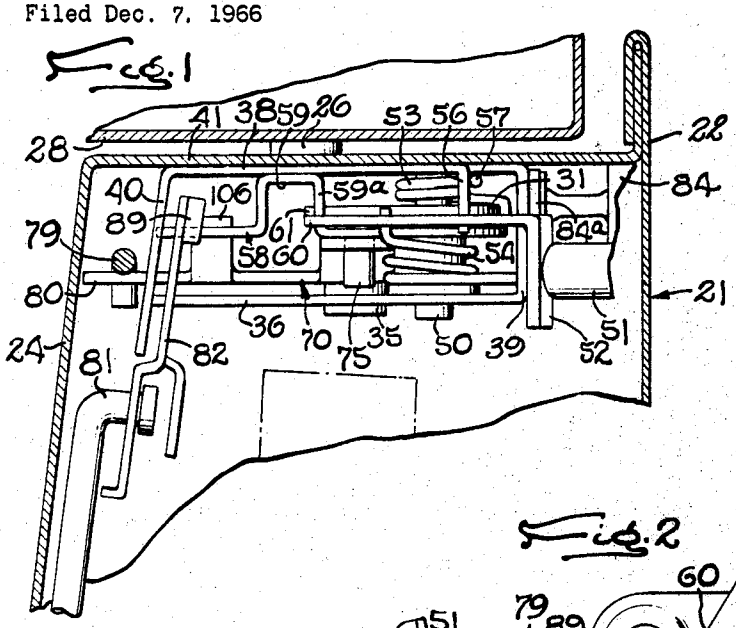


Fig. 2

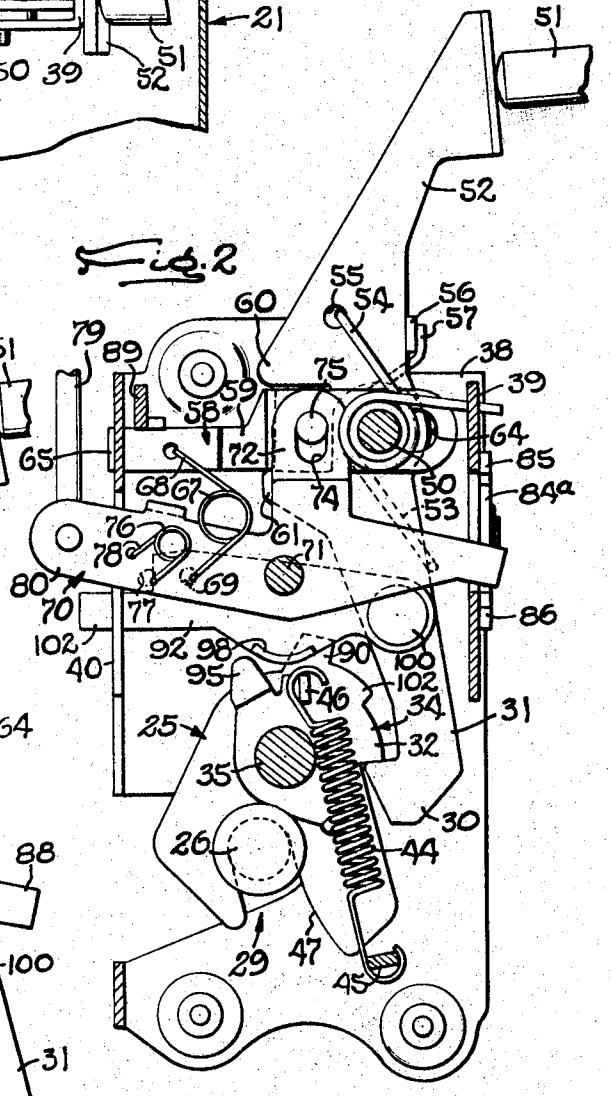
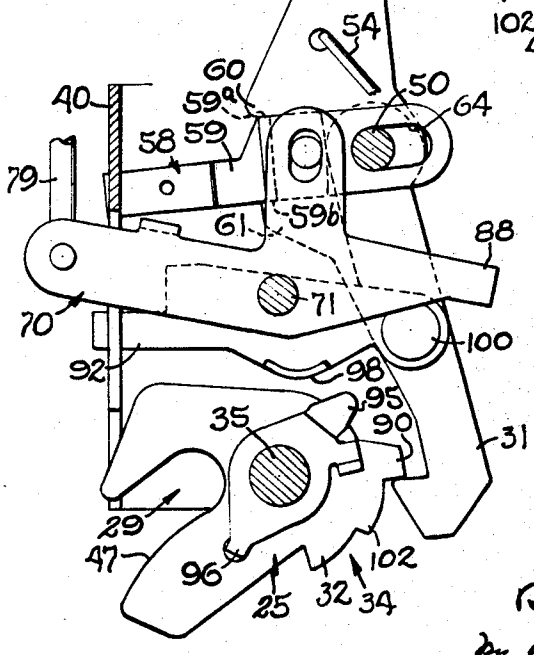


Fig. 3



INVENTOR

Robert E. Slattery

by Wolfe, Hubbard, Voit & Osann

ATTORNEYS

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DOOR LATCH FOR AUTOMOTIVE VEHICLES

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Fig. 4

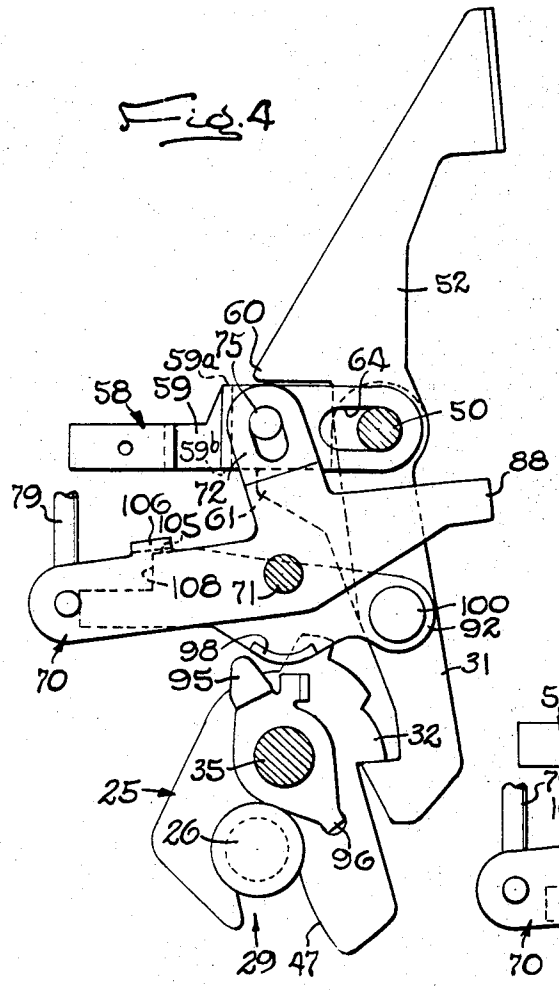


Fig. 5

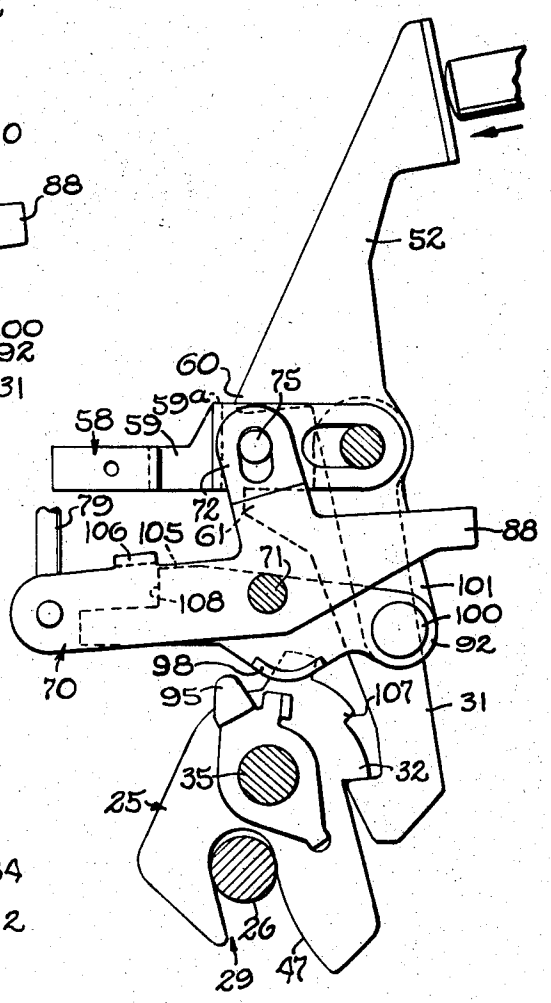
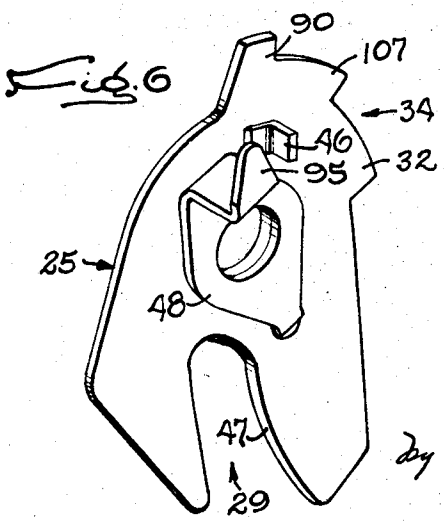


Fig. 6



INVENTOR

Robert E. Slattery

By Wolfe, Hubbard, Voit & Osann

ATTORNEY

Jan. 14, 1969 R. E. SLATTERY 3,421,785

DOOR LATCH FOR AUTOMOTIVE VEHICLES

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Fig. 7

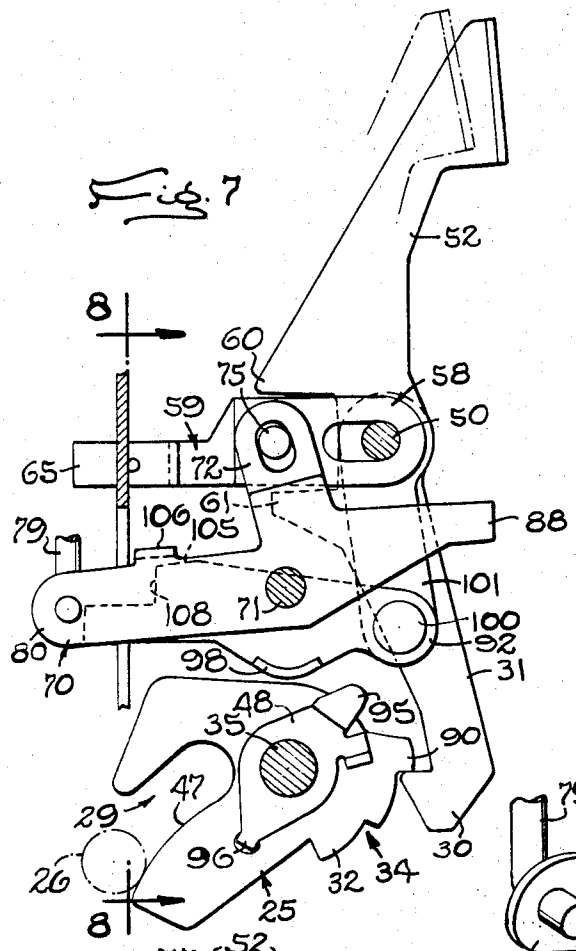


Fig. 8

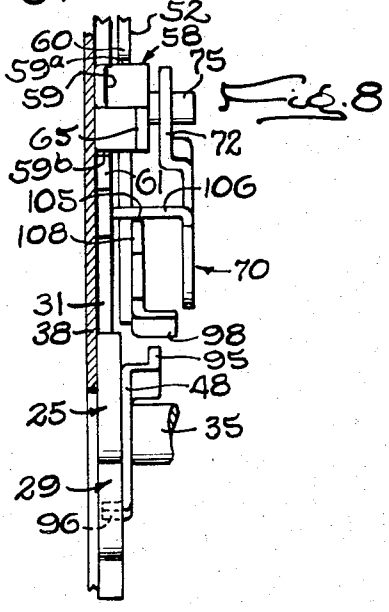


Fig. 9

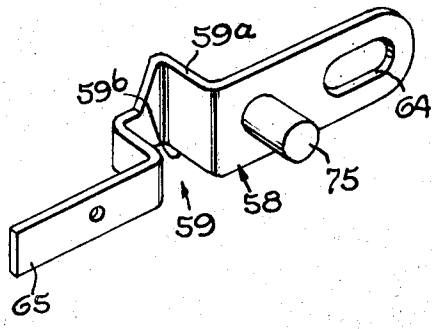
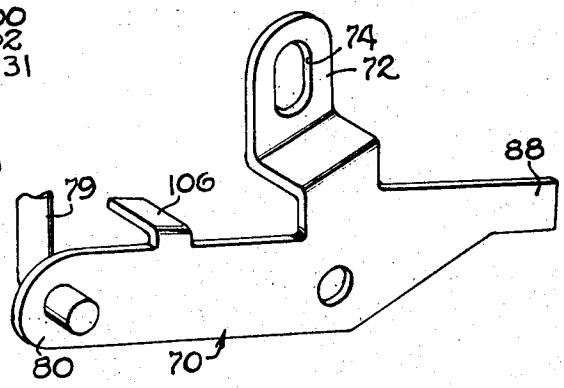


Fig. 10



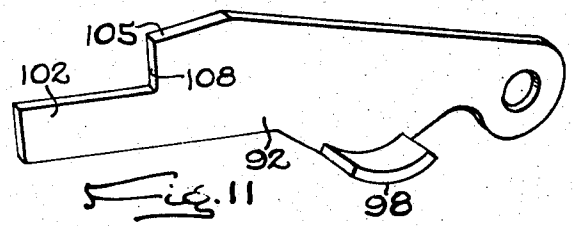


Fig. 11

INVENTOR

Robert E. Slattery

by Wolfe, Hubbard, Voit & Osann

ATTORNEY

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3,421,785

DOOR LATCH FOR AUTOMOTIVE VEHICLES

Robert E. Slattery, Rockford, Ill., assignor to L. W. Menzimer, trustee, Rockford, Ill.

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U.S. Cl. 292—216 12 Claims
Int. Cl. E05c 3/00

ABSTRACT OF THE DISCLOSURE

The present invention relates to a latch for the doors of a vehicle and more particularly to a latch which may be locked from the inside by a conventional inside, remote control handle or garnish button and which may be locked from the outside of the vehicle with or without the use of a key. It comprises a rotatable latch member dogged by a pawl which is in turn operated by a contactor lever co-pivoted with the pawl. The connection between the pawl and contactor lever is effected by a sliding link mounted on the same pivot as the pawl and contactor. A cancellation lever is pivoted on the contactor lever and serves to shift the sliding link from a disconnect to a connect position upon being engaged by the rotatable latch member when closing the door. If the contactor lever is rotated to the unlatched position by an outside operator while the sliding link is in the disconnect position the cancellation lever is unable to shift the sliding link from the disconnect to the connect position.

Keyless locking from outside of the vehicle is obtained by sequential performance of two manual operations, namely, operation of a garnish button (or an inside remote lever) to a locking position and depression of the outside handle push button while the door is being closed. To prevent an unintentional keyless locking of the door, when the garnish button or inside remote lever is in a locking position without simultaneous depression of the outside push button, the latch is constructed to unlock with closing of the door. The returning of the latch to its unlocked position with closing of the door is called "cancellation."

Accordingly, the general object of the invention is to provide a new and improved latch of simple yet rugged construction and having the capabilities of either keyless locking or cancellation of locking upon the closing of the door.

Another object is to provide a latch having the capabilities of keyless locking and cancellation with a simple slidable link which in a first position renders an outside push button contactor effective to unlatch the door and which in a second position renders the contactor ineffective to unlatch the door but permits the contactor to idle in a free wheeling position with operation of the outside push button.

Another object of the invention is to construct the latch having the features of keyless locking and cancellation with a simple cancellation member carried by the contactor to an inoperative position during a free wheeling movement of the contactor.

A further object of the invention is to construct a simple and rigid latch construction with a main fulcrum post pivotally supporting a manually operable contactor, a pawl and a slidable link, the latter adapted to be interposed between the contactor and pawl.

Other objects and advantages will become apparent as the following description proceeds, taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a sectional view taken through a vehicle door and pillar showing in place the latch constructed in accordance with the present invention.

FIG. 2 is a sectional view of the latch and shows the parts in the latched and unlocked position.

FIG. 3 is a view similar to FIG. 2 and shows the parts in the unlatched and unlocked position.

FIG. 4 is a view similar to FIG. 3 but shows the parts in a latched and locked position.

FIG. 5 is a view similar to FIG. 4 but shows the parts in a lock and freewheeling position.

FIG. 6 is an enlarged perspective view of a latch member on which is formed an integral toothed ratchet.

FIG. 7 is a view similar to FIG. 4 but shows the parts in an unlatched and locked position.

FIG. 8 is a sectional view taken along the line 8—8 of FIG. 7 showing an end view of the parts.

FIG. 9 is an enlarged perspective view of the conecting link for the contactor and pawl.

FIG. 10 is an enlarged perspective view of a locking member.

FIG. 11 is an enlarged perspective view of a cancellation member.

As shown in the drawings for purposes of illustration, the invention is embodied in a latch **20** for use in a relatively small space within a vehicle door **21** at its free end and between outer and inner sides **22** and **24** respectively of the door. When the door is closed as seen in FIGS. 1 and 2, a latch member **25** coacts with a striker **26** secured to a pillar **28** of the vehicle body to latch the door shut. The striker may, as illustrated herein, be a cylindrical post which extends horizontally and is alined for movement into and from a slot **29** in the latch member with opening and closing of the door.

When the door is in a closed and latched position as seen in FIG. 2, the latch member **25** is held against turning to release the striker **26** from its slot **29** by a hooked nose **30** of a pawl **31** inserted into a first tooth **32** of a toothed ratchet **34** integrally formed on the upper and outer side of the latch member. Herein, the latch member is journaled on a shaft **35** extending horizontally between vertical extending support plates **36** and **39** spaced apart by and secured to each other by narrow and opposite side wall or plates **39** and **40** extending normally to constitute a box-like bracket for the parts of the latch. The side plate **38** of this support bracket is secured to the inside door jamb wall **41** which has an opening to expose the slot **29** of the latch member for latching with the striker post **26** when the door swings to the closed portion of FIG. 1.

The pawl **30** holds the latch member **25** in a latched position against the turning force of a stretched contractile spring **44** hooked between a spring hanger tab **45** on the side plate **36** and a tab **46** on a member **48** secured to a vertical side of the latch member. The spring **44** is strong enough to maintain the latch position when the door is unlatched and is stretched during closing of the door as the striker **26** engages a curved lower cam surface **47** on the latch member forming one side of the slot **29** and turns the latch member counterclockwise (FIG. 2). The pawl **31** holds the latch member **25** against turning clockwise as seen in FIG. 2, under the influence of the spring.

Herein, the pawl **31** is in the form of a lever extending generally downwardly from an upper fulcrum post **50** which spans and is secured to the spaced vertical sideplates **36** and **38**. For biasing the hooked nose of the pawl to engage a tooth of the ratchet **34**, a torsion spring **53** is disposed on the shaft **50** with an upper end **57** (FIG. 1) engaging a bracket lug **56** and the lower end engaging the lower right side of the pawl. The lug **56** also extends laterally sufficiently to intercept and to engage the upper portion of the contactor and thereby limit its clockwise turning (FIG. 2) as the contactor returns the push pin **51** and the outside push button to their non-

operated positions with release of the outside push button. As the turning force of the main latch spring **44** exerts a substantially straight downward pull on nose **30** of the pawl, the pawl spring **53** has sufficient strength to hold the pawl nose **30** seated in the tooth **32** of the latch member so that the door is latched in the usual safety position.

The latch may be released from the outside of the vehicle by pressing a push button (not shown) on the outside handle to slide a push pin **51** further into the door to abut a lateral offset on the upper end of a contactor **52** which pivots and moves the pawl **31** to release its nose **30** from the tooth **32** of the latch member. Upon release, the spring **44** turns latch member from the position of FIG. 2 to that of FIG. 3, the unlatched position, in which the striker **26** is free to move through the slot **29** with opening of the door. The contactor for actuating the pawl is fulcrumed on the main support pin **50** and is biased clockwise (FIG. 2) against the push pin by a coiled torsion spring **54** disposed about the shaft **50** with one of its ends hooked to the contactor at a hole **55** and with the other end bearing against the wall **39** on the support bracket.

To enable the contactor **52** to pivot the pawl **31** to its release position, a connecting link **58** is positioned to bring a lateral extension in the form of a U-shaped bend **59** beneath an upper lug **60** on the contactor and over a lower lug **61** on the pawl. With the bend **59** of the link interposed in an operative position between the lugs **60** and **61**, the turning of the contactor **52** by the push pin **51** transmits a downward force to the link **59**, which also pivots downwardly about the main support pin **50**, and transmits a turning force to pivot the pawl **31** counterclockwise (FIG. 2) about its axis to the release position shown in FIG. 3. The link is mounted at its right end (FIG. 2) on the pin **50** for longitudinal sliding by means of a slot **64** sized to fit the pin **50**. The left end **65** of the link extends through a vertical slot **66** in the bracket wall **40** and the upper edge of the slot limits the upward pivoting of the link about the pin **40** by a coiled spring **67**, which has an upper leg **68** inserted in a hole in the link and a lower leg hooked in a hole **69** (shown in phantom lines in FIG. 2) in the bracket wall **36**. The spring raises the link to its normal horizontal position (FIG. 2) when the latter is released by the contactor **52** (FIG. 3).

To interconnect the contactor **52** and the pawl **31**, the transverse bend **59** in the link **58** extends laterally from its right end across the planes of the contactor **52** and the pawl **31**. More specifically, the upper edge **59***a* of a leg of the bend (FIGS. 1 and 9) extends normal to the contactor **52** and beneath its lug **60** and the lower edge **59***b* overlies the top of the lug **61** on the pawl **31**. Therefore, the lateral extension or bend **59** bridges the lateral space between the planes of the contactor and pawl.

In order to lock the latch, a locking member in the form of a horizontal locking lever **70** is fulcrumed intermediate its ends on a stub shaft **71** fixed on the bracket side wall **36**. Disposed centrally and upstanding from the locking lever is an integral leg **72** in which is a vertical slot **74** to receive a pin **75** projecting from the side of the connecting link **58**. When the locking lever is in unlocked position (FIGS. 2 and 3) the lateral bend **59** of the connecting link is positioned to couple the contactor **52** to the pawl **31** for unlatching the latch member **25** upon actuation by the push pin **51**. When the locking lever is pivoted counterclockwise to the locked position of FIGS. 4 and 5, its upstanding leg **72** engages the pin **75** on the connecting link **58** and slides the link leftwardly. When the link is moved leftwardly the bend **59** and its edges **59***a* and **59***b* are shifted from between the lugs **60** and **61** and a subsequent pivoting of the contactor **52** by the push pin results in an idle motion or freewheeling of the contactor as it pivots its lug **60** downwardly from the position of FIG. 4 to that of FIG. 5. Thus, the push button and contactor make an idle motion without turning the pawl when the latch is in a locked position.

The locking lever **70** is biased toward the locked and unlocked positions by an over-center spring **76** (FIG. 2) acting between the bracket wall **36** and the locking lever. Herein, the spring **76** is a coiled spring with one end anchored in a hole **77** in the bracket wall **36** and with the other end **78** anchored in a hole in the locking lever. As the locking lever is turned to and from a locked or unlocked position, the end **78** of the spring moves across a centerline drawn between the hole **77** and the axis of the pivot axis **71** and snaps the locking lever to the position in which it is being moved.

As is customary with latches on a vehicle, the locking lever **70** is moved between locked and unlocked positions from inside of the vehicle either by a garnish button (not shown) located on a moulding at the window on the inside of the door and attached to a wire **79** (FIG. 2) hooked to one end **80** of the locking lever or by a remote control handle (not shown) attached to a wire **81** (FIG. 1) and an operating lever **82**. From the outside of the door, the locking lever may be moved to a locked or unlocked position by turning a key in cylinder **84** to swing a fork **84***a* (FIG. 2) pivoted on the outside of the bracket wall **39** to move an upper or lower bifurcation **85** or **86** against an end **88** of the locking lever and to pivot the locking lever to the other position.

To release the latch from the inside, the remote control handle is operated to move the wire **81** to pivot the operating lever **82** (FIG. 1) which has a lower laterally offset extension **89** (FIGS. 1 and 2) disposed in engagement with the top surface of the connecting link **58**. Upon turning of the remote operating lever to move the extension **89** downwardly, the connecting link pivots about the pin **50** and, when positioned over the pawl lug **61**, forces the pawl **31** to pivot counterclockwise (FIG. 2) to move the pawl nose **30** from the tooth **32** of the ratchet wheel whereby the spring **44** turns the latch member **25** to bring a longer top tooth **90** against the pawl nose **30** as seen in FIG. 3. With release of the remote control handle, spring **67** pivots the connecting link upwardly to remain in its unlatched position beneath the lug **60** of the contactor **52**.

In accordance with the present invention, the latch is so constructed, that with the door open, keyless locking may be obtained by depressing the garnish button and by simultaneously holding the push pin **51** inwardly to swing a cancellation member **92** connected to the contactor **52** to an ineffective position, and cancellation is achieved, when the push pin is not depressed and the latch member **25** engages the cancellation member **92** and forces the latter to shift the locking lever **70** to its unlocked position whereby the connecting link **58** is reestablished in the operative connecting position between the contactor **52** and the pawl **31**. Thus, keyless locking is obtained by two separate manual operations, namely, the depressing of the garnish button and depressing of the push pin and contactor while swinging the door closed, and unintentional locking of the door is prevented when only one manual operation is performed, namely, depression of the garnish button before closing the door.

To achieve cancellation, the closing of the door causes the striker **26** to engage the inclined cam surface **47** on the latch member **25** and to pivot the same counterclockwise (FIG. 7). This moves a cam **95** on member **48**, which is secured to the latch member, against the cancellation lever **92** which, in turn, pivots upwardly about its right end to bring its left end against the locking lever **70** to pivot the latter upwardly to the unlocked position of FIG. 1. As the locking lever pivots to the unlocked position, its finger **72** slides the link **58** rightwardly to its operative connecting position between the contactor and

the pawl. The cam **95** on the latch member is in the form of a laterally offset and upstanding finger on the member **48** fixed by a tab **96** (FIG. 6) in the side of the latch member for turning on the shaft **35**.

When the cancellation lever **92** is in an operative position, a curved flange **98** on its bottom edge extends laterally into the plane and path of movement of the cam **95**. The cancellation lever is disposed generally horizontal with its right end pivotally connected by a pin **100** to a lower end **101** (FIG. 5) of the contactor and with its opposite end **102** resting on the bottom of vertical guide notch in the bracket side wall **40**. When the cam finger **95** engages the flange **98** and pivots the cancellation lever **92** clockwise (FIG. 7) about the pivot pin **100**, an upper inclined edge **105** on the cancellation lever **92** moves into engagement with the lower side of an overhanging lateral extension **106** on the locking lever. The upward force on the extension **106** pivots the locking lever **70** clockwise (FIG. 7) and its upstanding finger **72** engaging the pin **75** slides the link **58** rightward to reestablish the operative connection with the spaced lugs on the contactor **52** and the pawl **31**. Thus, the latch is unlocked during closing of the door and the parts are again in the latched and unlocked position of FIG. 2.

To achieve keyless locking, the cancellation lever **92** is disabled by being moved rightwardly (FIG. 5) to shift its upper engaging surface **105** rightwardly of the lateral extension **106** on the locking lever. Therefore, when the door is subsequently closed and striker **26** turns the latch member **25** to cause the cam **95** to engage and pivot the cancellation lever upwardly, its inclined surface **105** misses the lateral extension **106** and moves a cutout **108** (FIG. 11) on the cancellation lever upwardly toward extension **106** of the locking lever which remains in its locking position. This idle upward pivoting of the cancellation lever **92** leaves the locking lever in its counterclockwise locked position holding the link **58** disposed in its ineffective position. The parts remain in the latched and locked position of FIG. 4 and any operation of the outside pushbutton merely causes freewheeling of the contactor **52** without releasing the latch pawl **31** from the tooth **32** of the latch member.

To gain the attention of one who only partially closes the door, the latch can not be locked until the door is completely closed and in the latched position of FIG. 2. If the door is only partially closed, the latch member **25** turns through a shortened arc and the pawl **31** engages an intermediate tooth **107** and holds the latch member against release and the latch member has its cam **95** engaging and lifting the cancellation lever **92** to a position in which its surface **105** is lifted to engage the lateral extension **106** on the locking lever **70** to hold the latter from turning to its locking position (FIG. 7). The locking lever may turn slightly counterclockwise toward its locking position but the cancellation lever prevents sufficient turning to permit the overcenter spring **76** (FIG. 2) to become effective to snap the locking lever to the locking position (FIG. 3).

From the foregoing it will be seen that the latch is simple in construction and operation and affords the capabilities of keyless locking, cancellation and freewheeling of the push button and contactor.

I claim as my invention:

1. In a door latch, the combination of, a support, a rotatable latch member mounted on the support, a tooth ratchet connected to said latch member to turn therewith between latched and unlatched positions, a main pivot pin on the support, a pawl pivoted on said pin and extending downwardly to said latch member to swing between a first position in which it engages a tooth of the ratchet and a second position in which it releases the ratchet, a manually operable contactor pivoted on said pin and operable to pivot said pawl to said second position, a link mounted for sliding movement on said support to be interposed between said contactor and the pawl in a first position in which the link pivots with said contactor to force said pawl to pivot to its release position, said link slidable to a second position whereby said contactor pivots without pivoting the pawl, a locking lever pivotally mounted on the support and connected to said link to slide said link to disconnect the contactor and pawl when the locking lever is in a locked position and to interpose the link between the contactor and pawl when the locking lever is in an unlocked position, a manually operable member connected to said locking lever to pivot the locking lever to and from the locked and unlocked positions, a cancellation lever pivoted on the lower end of the contactor to swing between a first position in which the locking lever may be operated to its unlocked position and a second position in which the cancellation lever is out of operative contact with the locking lever, and a cam means on the latch member operable with rotation of the latch member to pivot the cancellation lever which when in its first position, is operable to pivot the locking lever to its unlocked position whereby the latch is unlocked.

2. The combination of claim **1** in which said slidable link extends generally horizontal and has a transverse offset for insertion between the manually operable member and the pawl when said link is in its first position.

3. The combination of claim **1** including a remote control member operably associated with said link to operate the latter to release the pawl from the latch member when the link is in its first position.

4. In a door latch, the combination of, a support, a latch member pivotally mounted on said support to turn between latched and unlatched positions, a mechanism selectively operable to hold said latch member in said latched position and to release the member for turning to the unlatched position, a locking member mounted on said support to move between locked and unlocked positions, a manual element operable to move said locking member to said locked position, a contactor manually operable from outside and pivotable on the support to a position for operating the mechanism to release the latch member unless disabled by said locking member, and a cancellation member pivoted on said contactor and movable by the latter to a first position for shifting the locking member to its unlocked position upon turning of the latch member to its latched position, said cancellation member being movable by said contactor to a disabled position so that the latch remains locked with turning of the latching member to its latched position.

5. In a latch, the combination of, a latch member, a fulcrum shaft, a pawl pivoted on the fulcrum shaft to turn selectively to hold and to release the latch member, a manually operable member pivoted on the fulcrum shaft, a link pivotally and slidably supported on said fulcrum shaft to be interposed between said member and pawl in a first position in which the link pivots with the manually operable member to turn the pawl to its release position, said link slidable to a second position in which the manually operable member pivots without turning the pawl to its release position, and a locking means connected to said link to slide the same between the first and second positions.

6. The combination of claim **4** including a cancellation member connected to said manually operable member and engaged by said latch member to shift said locking means to unlock the latch by moving said link to its first position, said cancellation member movable by said manually operable member to another position in which the cancellation member is disabled from shifting the locking means to unlock the latch.

7. In a door latch, the combination of, a support, a latching member rotatably mounted on the support, a toothed ratchet mounted on said support to turn with said latching member between latched and released positions, a pawl fulcrumed on the base to swing between a first position in which it engages a tooth of the ratchet and a second position in which it releases the ratchet, a manually operable member operable to move the pawl

to send second position, an interposer movable to a first position to connect said manually operable member to said pawl for movement of the latter to the second position, said interposer movable to a second position to disconnect said manually operable member from said pawl, a locking member mounted on said support to move between an unlocked position and a locked position and in the latter position disposing said interposer in its second position to allow freewheeling of said manually operable member, and a cancellation member connected to said manually operable member and movable by the latter to a first position in which the cancellation member is responsive to movement of the latching member to its latch position to move the locking member to dispose the interposer in its operative connecting position, said cancellation member movable by operation of said manually operable member to a second position in which the cancellation member is disabled from moving the locking member to its unlocked position during the moving of the latch member to its latched position.

8. The combination of claim **7** in which said interposer is a link mounted for sliding on the support and further including a support pivot pin on support for journaling said pawl and said manually operable member, said slidable link having an elongated slot receiving said pin for journaling said slidable link for pivoting with said manually operable member and pawl when the link is in its first position, said slot permitting said link to slide to its second position for disconnecting said manually operable member from said pawl.

9. The combination of claim **7** in which the cancellation member is pivoted to the lower end of said manually operable member for translating with pivoting of the latter between its first and second positions, said cancellation member being disposed beneath the locking lever when in its first position and pivoted upward by said latching member to engage and pivot the locking lever to its unlocked position, and the combination further including a pin and slot connection between the locking member and the interposer to shift the latter to connect the manually operable member and pawl with pivoting of the locking lever to its non-locking position.

10. The combination of claim **7** including a further manually operable member connected to the locking member for shifting the locking member to and from its locked and unlocked positions, said manually operable member being shifted and overridden by operation of said locking lever to its unlocked position by said cancellation member.

11. A door latch as defined in claim **4** in which said latch member turns through a safety position between said latched and said unlatched positions and in which said cancellation member shifts said locking member to the unlocked position when the latch member is in said safety position.

12. In a latch, the combination of, a support, a latch member mounted on said support to turn between latched and unlatched positions, a ratchet connected to said member to turn bodily therewith, mechanism for permitting said latch member to turn from said latched position to said unlatched position and including a pawl engageable with said ratchet and a manual operator movable between inactive and active positions, said mechanism having a locked condition in which said operator is uncoupled from said pawl and an unlocked position in which the operator is coupled to the pawl to release the pawl from said ratchet as the operator is moved to the active position, a lever mounted on said support to turn between first and second positions, a cam rigid with said ratchet and engageable with said lever as said latch member turns to the latched position thereby to turn the lever from said first position to said second position, said mechanism including a movable abutment normally disposed in the path of said lever to be engaged by the lever as the latter moves to said second position and to place said mechanism in said unlocked condition, and a connection coupling said operator and said abutment and operable to move the abutment out of the path of said lever as the operator is moved to said active position.

References Cited

UNITED STATES PATENTS

2,707,124	4/1955	Wartian	292—280
2,877,043	3/1959	Leslie	292—280
3,129,026	4/1964	Gergoe et al.	292—280
3,153,551	10/1964	Sandor et al.	292—280
3,190,682	6/1965	Fox et al.	292—216

MARVIN A. CHAMPION, *Primary Examiner.*

JOHN MOSES, *Assistant Examiner.*