United States Patent

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[54] **DOOR-LOCKING ARRANGEMENT**
4 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **70/101,**
292/216, 292/DIG. 23
[51] **Int. Cl.** **E05b 65/32**
[50] **Field of Search** 292/216,
280, 198; 70/101, 136, 237

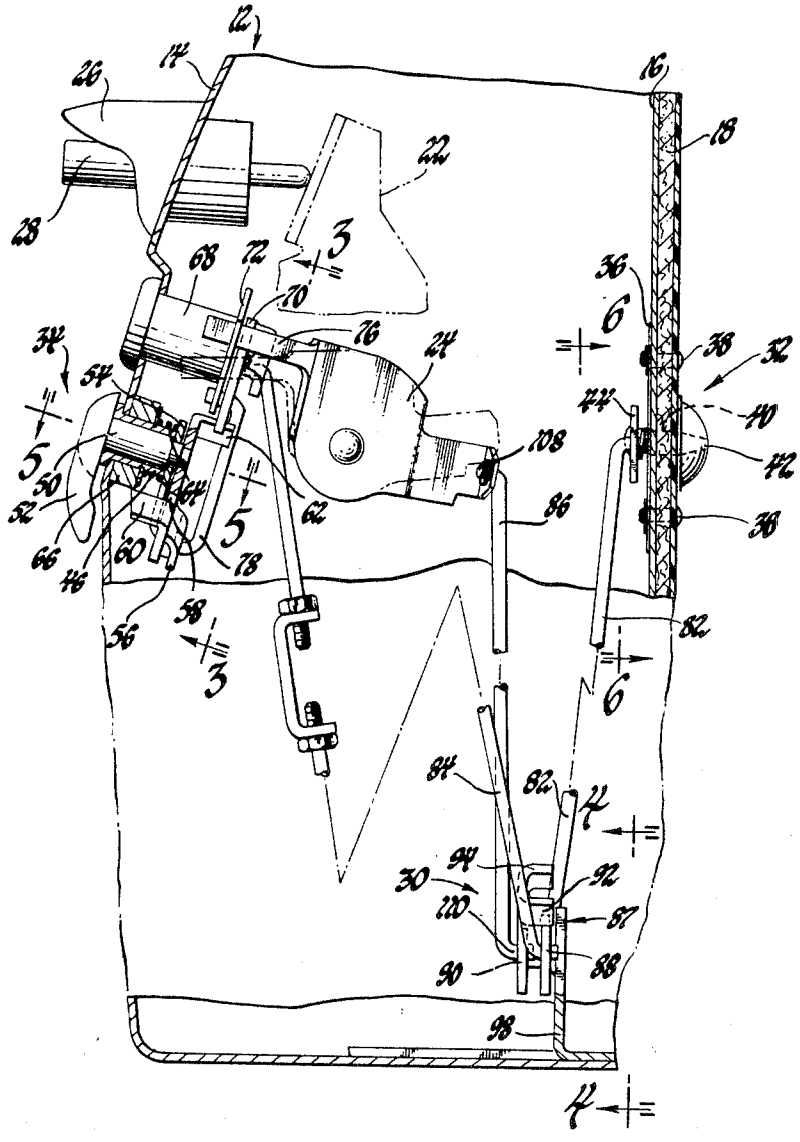
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ABSTRACT: A locking lever control arrangement on a vehicle door having a latch mechanism with a locking lever which automatically returns from an unlocked to a locked position upon closing movement of the door includes a three position internal control member on the door inner panel, a two position external control member on the door outer panel, a bellcrank, a blocking member and draft links connecting the internal control member to the bellcrank, the bellcrank to the locking lever and the bellcrank to the blocking member. The external control member is operable to move the locking lever from locked to unlocked position and the internal control member is operable upon movement to one position to rotate the blocking member to a blocking position preventing movement of the external control lever and upon movement to another position to move the locking lever from locked to unlocked position, and the locking lever is operable upon automatic movement from the unlocked to the locked position to move the internal control member to the third of the three positions thereof.



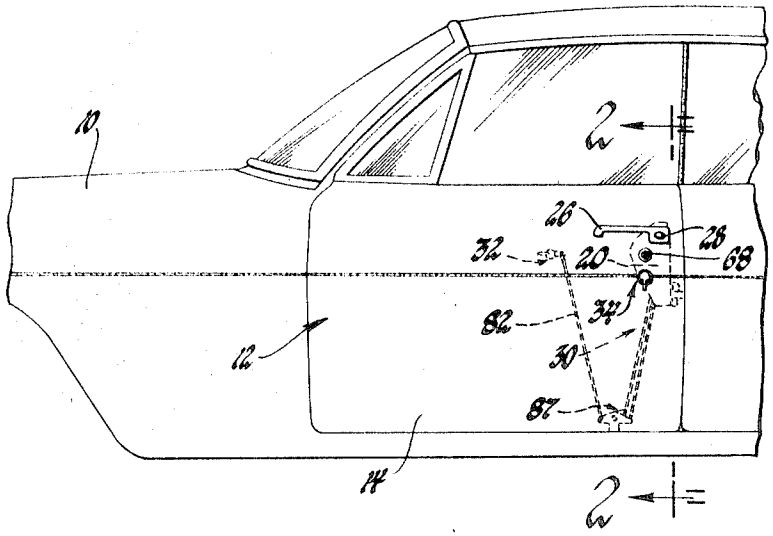


Fig. 1

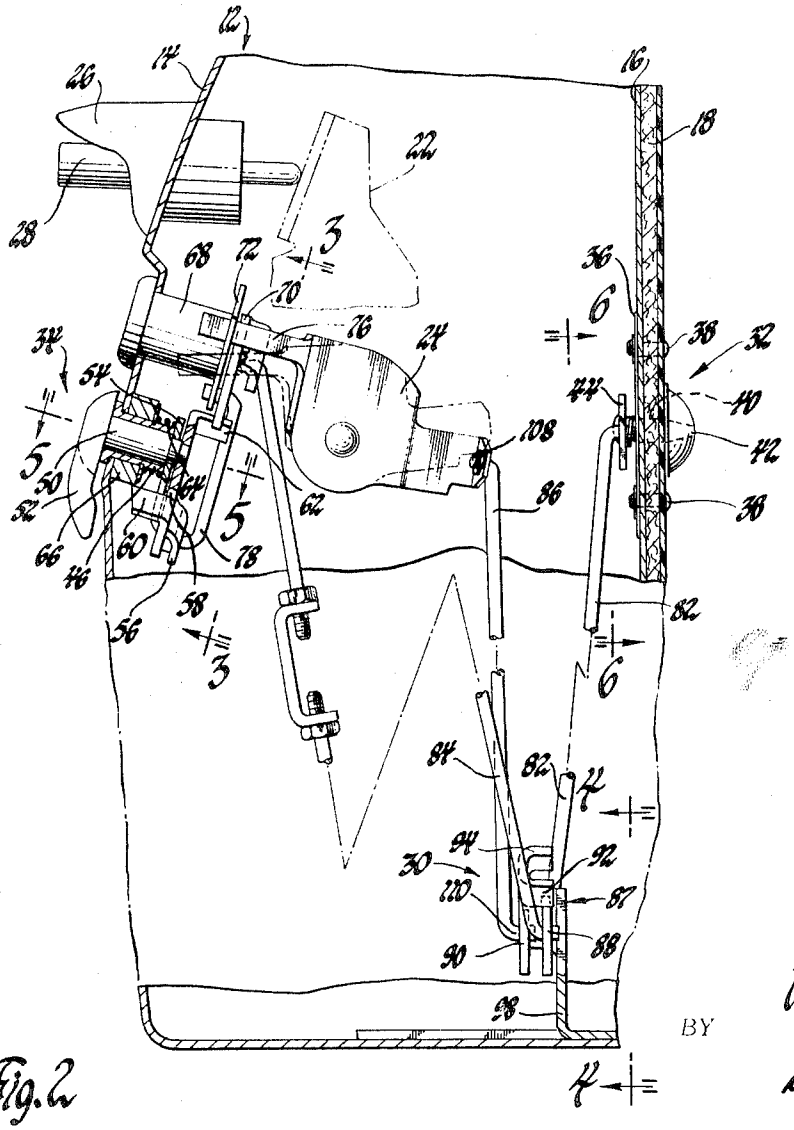


Fig. 2

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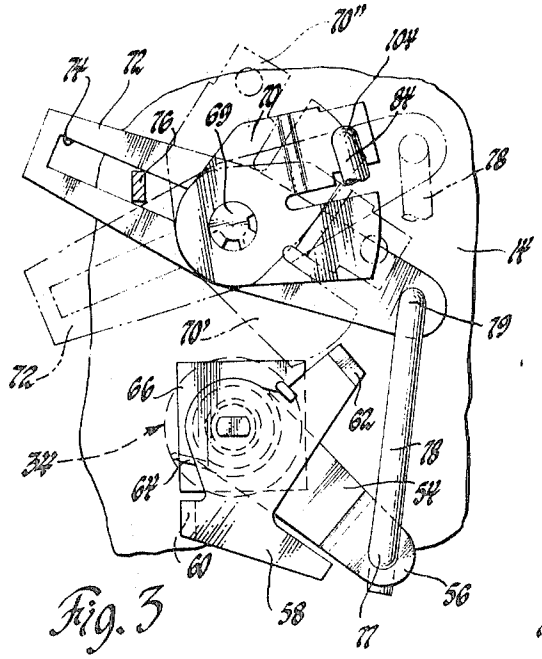


Fig. 3

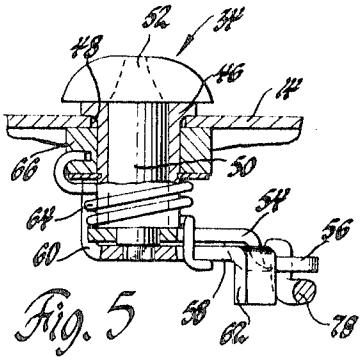


Fig. 5

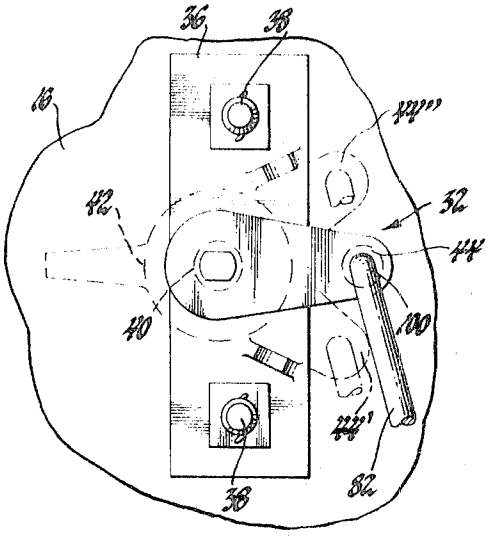


Fig. 6

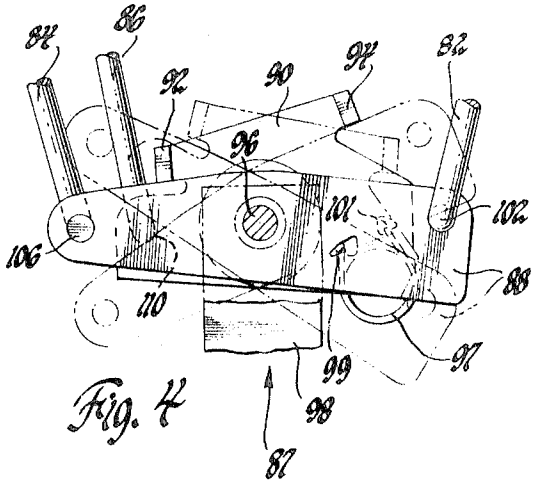


Fig. 4

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DOOR-LOCKING ARRANGEMENT

This invention relates generally to vehicle type door latches having locking levers and in particular to a locking lever control arrangement for door latches which automatically lock upon closing of the door member.

Conventional vehicle-type door latches are operable to releasably maintain the vehicle door in closed position and typically include locking levers which, when manually moved from an unlocked to a locked position, as by a conventional garnish button, render both the internal and external latch actuators ineffective to operate the latch and release the door member.

A recently proposed door latch, however, incorporates features which automatically move the locking lever from unlocked to locked position each time the door member is moved from the open to the closed position and therefore requires a more intricate arrangement for manually manipulating the locking lever. The locking lever control arrangement according to this invention is of relatively simple mechanical design yet is flexible enough to permit the vehicle operator to manually and keylessly move the locking lever from locked to unlocked position from inside or outside of the vehicle and to secure the locking lever from inside or outside of the vehicle against unauthorized manipulation out of its locking position from outside of the vehicle.

The primary feature, then, of this invention is that it provides a new and improved vehicle door latch locking lever control arrangement. Another feature of this invention is that it provides a control arrangement for a locking lever on a door latch incorporating means which automatically move the locking lever from an unlocked to a locked position upon closing of the door and which control arrangement includes means operable to move the locking lever from a locked to an unlocked position and to selectively block unauthorized manipulation of the latter from the locked position from outside the vehicle. Yet another feature of this invention resides in the provision of an external control member normally operable to move the locking lever from the locked to the unlocked position and selectively blockable by blocking means controlled either by an internal control member or by a lock cylinder assembly on the door member. A still further feature of this invention resides in the provision of transmission means operable to transmit movement from the internal control member to either the locking lever or a blocking member and from the locking lever back to the internal control member.

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 side elevational view of an automobile-type vehicle including a front door member having a locking lever control arrangement according to this invention;

FIG. 2 is an enlarged partially broken away sectional view taken generally along the plane indicated by lines 2–2 in FIG. 1;

FIG. 3 is an enlarged sectional view taken generally along the plane indicated by lines 3–3 in FIG. 2;

FIG. 4 is an enlarged sectional view taken generally along the plane indicated by lines 4–4 in FIG. 2;

FIG. 5 is an enlarged sectional view taken generally along the plane indicated by lines 5–5 in FIG. 2; and

FIG. 6 is an enlarged sectional view taken generally along the plane indicated by lines 6–6 in FIG. 2.

Referring now to FIG. 1 of the drawings, an automobile-type vehicle includes a body **10** having a door member **12** swingably mounted thereon for movement between a closed position, FIG. 1, closing a door opening in the body and an open position, not shown, exposing the door opening. The door member **12** generally includes an outer panel **14** and an inner panel **16** with decorative trim panel **18** thereon joined in spaced relationship by a pair of vertical side panels, not shown. A door latch mechanism **20**, such as that shown in the

copending application of Bela Sandor, Ser. No. 713,156, filed Mar. 14, 1968, now U. S. Pat. No. 3,523,704, dated Aug. 11, 1970 and assigned to the assignee of this application, is mounted on the door member **12** between the inner and outer panels and generally includes an actuating lever **22** and a locking lever **24**. A door handle **26** carrying a conventional actuating button **28** is fixedly secured to outer panel **14** and depression of the actuating button **28** pivots actuating lever **22** of the door latch **20** to thereby normally release the door member from the closed position. Movement of the locking lever **24**, however, from an unlocked position to a locked position, shown respectively in broken and solid lines in FIG. **2**, effectively disconnects actuating lever **22** from the door latch so that the actuating button **28** is freely depressible without effecting the latched condition of the door. In the door latch **20** as described in the copending Sandor application, the locking lever **24** is automatically moved from the unlocked to the locked position each time the door member **12** is brought from the open to the closed position. A locking lever control arrangement according to this invention and generally designated **30** is provided on the door member to permit manual manipulation of the locking lever as described hereinafter.

The locking lever control arrangement **30** includes internal and external control assemblies **32** and **34**, respectively. Internal control assembly **32** includes a reinforcing plate **36** mounted on inner panel **16** by fasteners **38** and rotatably carrying a stub shaft **40**. Stub shaft **40** has an internal control knob **42** fixedly secured to one end thereof outside trim panel **18** and a crank **44** fixedly secured to the other end thereof on the opposite side of inner panel **16**. The crank is rotatable as a unit with the control knob generally between a locking position, shown in solid lines in FIG. **6**, an unlocking position **44'** and a securing position **44''**, FIG. **6**.

External control assembly **34** includes a sleeve **46** protruding through and fixedly secured in an aperture **48** in outer panel **14** which sleeve rotatably carries a stub shaft **50**. As seen best in FIGS. **3** and **5**, an external control knob **52** is fixedly secured to one end of stub shaft **50** while a first transfer lever **54** having an offset portion **56** is rotatably mounted thereon and a second transfer lever **58** including a pair of tabs **60** and **62** is fixedly secured thereto generally at the other end. A coil torsion spring **64** encircles sleeve **46** and has one end anchored in a square abutment **66** fixed on the sleeve and the other end anchored to the second transfer lever **58** to thereby bias the latter in a clockwise direction, FIG. **3**, resiliently maintaining tab **60** in contact with abutment **66**.

Referring now to FIGS. **1** and **3**, the locking lever control arrangement **30** further includes a lock cylinder housing **68** fixedly secured to outer panel **14** and carrying a lock cylinder assembly **69**, FIG. **3**, rotatable between a neutral position and either one of a locking position and an unlocking position. A blocking member **70** is secured to the inboard end of the lock cylinder assembly by conventional lost motion means, not shown, permitting unitary movement of the blocking member and lock cylinder assembly between an unblocking position, shown in solid lines in FIG. **3**, and a blocking position **70'**, FIG. **3**, and movement of the blocking member relative to the lock cylinder assembly from the unblocking position to either the blocking position **70'** or to an idling position **70''**, FIG. **3**. A third transfer lever **72** having an elongated aperture **74** therein is rotatably journaled on the lock cylinder assembly for movement relative thereto between the positions shown in solid and broken lines in FIG. **3** corresponding respectively to locked and unlocked positions of the locking lever **24**. A finger portion **76** projecting from the locking lever **24**, FIG. **2**, is captured within the elongated aperture **74** of the third transfer lever **72** so that movement of either member initiates corresponding movement in the other member. A connecting link **78** has one end pivotally connected to first transfer lever **54** at **77** and the other end pivotally connected to third transfer lever **72** at **79**.

The remainder of the locking lever control arrangement **30** includes first, second, and third draft links **82**, **84**, and **86**, respectively, and transmission means **87**, the function of which is to selectively transmit movement of various ones of the draft links to various others thereof. More particularly, with reference to FIG. **4**, the transmission means **87** includes a first lever **88** and a second lever **90**, the latter having inturned tabs **92** and **94** integral therewith. Both the first and second levers are rotatably mounted on a stub shaft **96** projecting generally perpendicularly from a bracket **98** fixedly secured to the door member, as by welding. A coil torsion-type overcenter spring **97** having one end anchored in the first lever at **99** and the other in the second lever at **101** functions to maintain the first and second levers in either of two relative positions wherein the upper edge of the first lever abuts either tab **92** on the second lever, as shown in solid lines in FIG. **4**, or abuts the other tab **94** on the second lever, as shown in broken lines in FIG. **4**. First draft link **82** has one end pivotally connected to crank **44** at **100**, FIG. **6**, and the other end pivotally connected to first lever **88** at **102**, FIG. **4**. Second draft link **84** has one end pivotally connected to blocking member **70** at **104**, FIG. **3**, and the other end pivotally connected to first lever **88** at **106**, FIG. **4**. Third draft link **86** has one end pivotally connected to locking lever **24** at **108**, FIG. **2**, and the other end pivotally connected to second lever **90** at **110**, FIG. **4**.

In operation, now, with the door member in closed position and with the locking lever **24** in locked position and the first and second levers **88** and **90** assuming the relative positions shown in solid lines in FIG. **4**, the draft links **82**, **84**, and **86** function to position crank **44** and internal control knob **42** in the locking position, shown in solid lines in FIG. **6**, and the blocking member **70** in the unblocking position, shown in solid lines in FIG. **3**, while third transfer lever **72** maintains the first and second transfer levers in the position shown in FIG. **3** through connecting link **78**. Thus locked, the door latch **20** is inoperative from either inside or outside of the vehicle to release the door member **12** from the closed position. To open the door member from inside of the vehicle, the knob **42** and crank **44** are manually rotated clockwise to unlocking position **44'**, FIG. **6**, bodily shifting draft link **82** downward to thereby unitarily pivot first and second levers **88** and **90** clockwise, FIG. **4**, with spring **97** maintaining the relative position thereof. Clockwise pivotal movement of the first and second levers bodily shifts both second and third draft links **84** and **86** upwardly respectively pivoting the blocking member **70** counterclockwise, FIG. **3**, from the unblocking position toward idling position **70''** through the lost motion connection to the lock cylinder assembly **69** and rotating the locking lever **24** from the locked to the unlocked position, FIG. **2**. With the locking lever **24** so positioned, either a conventional inside door handle, not shown, or outside actuator button **28** is operable to actuate the door latch **20** to release the door **12** from the closed position.

From outside of the vehicle, the normal closing movement of the door member which automatically rotates the locking lever **24** from unlocked to locked position causes bodily shifting of draft link **86** downwardly unitarily rotating the first and second levers counterclockwise and pivoting the blocking member **70** back from the idling position to unblocking position and the internal control handle and crank **44** back to locking position. With the latch again locked, keyless entry into the vehicle is achieved by rotating external control knob **52** and second transfer lever **58** counterclockwise, FIG. **3**, to initiate engagement between the latter and tab **56** on the first transfer lever **54** thereby rotating the transfer lever **54** counterclockwise and bodily shifting link **78** upward. Upward shifting of link **78** rotates the third transfer lever **72** counterclockwise, FIG. **3**, from the solid to the broken line position which rotation initiates corresponding counterclockwise rotation, FIG. **2**, of the locking lever **24** from the locked to the unlocked position permitting normal actuation of the latch **20** and release of the door member **12** by actuator button **28**. Release of external control knob **52** permits rotation of second transfer lever **58** and control knob **52** back to their original positions by torsion spring **64**, while first and third transfer levers **54** and **72**, respectively, are maintained by locking lever **24** in rotated positions corresponding to the unlocked position of the locking lever.

Conversely, from outside of the vehicle with the door member closed and the latch **20** locked as described hereinbefore, the control arrangement can be secured against unauthorized external operation by inserting a proper key, not shown, into the lock cylinder assembly **69** and rotating the latter from the neutral to the locking position. Such rotation of the lock cylinder assembly directly rotates blocking member **70** clockwise, FIG. **3**, from the unblocking to the blocking position **70'** wherein a portion of the blocking member lies adjacent tab **62** of the second transfer lever **58**. Clockwise rotation of the blocking member **70** bodily shifts second draft link **84** downward, overcoming spring **97** and pivoting first lever **88** counterclockwise relative to the second lever **90** to the second of the two relative positions therebetween, shown in broken lines in FIG. **4**, while the first draft link **82** is bodily shifted upwardly to rotate the crank **44** and the internal control knob counterclockwise, FIG. **6**, to securing position **44''**. With the blocking member **70** so positioned, attempted rotation of the control handle **52** and second transfer lever **58** as described hereinbefore initiates interference between the blocking member and tab **62** to thereby prevent unlocking movement of second transfer lever **58** and, consequently, third transfer lever **72** and locking lever **24**. From inside of the vehicle, however, internal control knob **42** and crank **44** may be rotated from the securing position **44''** to the unlocking position **44'** causing first draft link **82** to overcome spring **97** and rotate first lever **88** relative to second lever **90** until contacting tab **92** whereupon the two levers rotate unitarily to move the locking lever to unlocked position and the blocking member **70** to unblocking position.

From the locked and secured position as recited hereinbefore, the door member may be reopened from outside of the vehicle by rotating the lock cylinder assembly from the neutral to the unlocking position thereby rotating blocking member **70** counterclockwise, FIG. **3**, out of blocking position so that the external control knob **52** may again be rotated to move the locking lever **24** to the unlocked position as described hereinbefore. The actuator button **28** may then be depressed to actuate latch **20** to release the door member.

The internal control assembly **32** is operable to secure the locking arrangement against unauthorized manipulation from outside of the vehicle. More particularly, as described hereinbefore, by merely swinging the door member to the closed position the locking lever is brought to locked position, the control knob **42** and crank **44** are brought to locking position shown in solid lines in FIG. **6**, and the first and second levers **88** and **90** assume the solid line positions shown in FIG. **4**. From this condition, counterclockwise rotation of crank **44** to securing position **44''** bodily shifts first draft link **82** upward, overcoming spring **97** and pivoting first lever **88** counterclockwise relative to second lever **90**, FIG. **4**. Counterclockwise rotation of the first lever **88** bodily shifts second draft link **84** downward thereby pivoting blocking member **70** relative to the stationary lock cylinder assembly **69**, through the lost motion connection therebetween, to the blocking position, FIG. **3**, wherein the blocking member **70** again lies adjacent to tab **62** so that movement of external control knob **52** is prevented. It will, of course, be understood that the blocking member **70** may be pivoted back to unblocking position by rotation of the lock cylinder assembly from the neutral to the unlocking position as recited hereinbefore.

The internal control assembly is also operable with the door member in the open position to provide convenient keyless securing of the locking arrangement against unauthorized manipulation during absence of the operator from the vehicle. Opening of the door member **12** necessarily begins with moving of the locking lever to unlocked position, the crank **44** and

internal control knob 42 to the unlocking position 44' and the first and second levers unitarily rotated clockwise, FIG. 4, from the solid line position. After the door has been swung open, manual movement of the internal control knob 42 and crank 44 to the securing position 44'' bodily shifts draft link 82 upward, overcoming spring 97 and pivoting first lever 88 counterclockwise. Counterclockwise movement of the first lever bodily shifts draft link 84 downward pivoting the blocking member 70 clockwise from the unblocking to the blocking position, FIG. 3, thereby preventing movement of external control knob 52 as described hereinbefore. With external control knob 52 thus secured, closing of the door member merely rotates the locking lever 24 from the unlocked to the locked position bodily shifting draft link 86 downward and overcoming spring 97 to thereby pivot the second lever 90 counterclockwise until tab 92 abuts first lever 88. The door member is thus locked and keylessly secured against unauthorized opening during absence of the operator of the vehicle.

Having thus described the invention, what I claim is:

1. In a vehicle body having a door member swingably mounted thereon for movement between an open position exposing a door opening in said body and a closed position closing said door opening, said door member having a latch member thereon operable to releasably maintain said door member in said closed position and including a locking lever movable between locked and unlocked position which locking lever automatically returns to said locking position upon movement of said door member to said closed position, a locking lever control arrangement comprising an internal control member, means mounting said internal control member on said door member for accessibility from inside of said body in said closed position of said door member and for movement relative to the latter between at least three distinct positions, an external control member, means mounting said external control member on said door member for accessibility from outside of said body in said closed position of said door member and for movement relative to the latter between at least two distinct positions, means operably connecting said external control member to said locking lever so that movement of the former between said two positions moves said locking lever between said locked and unlocked positions, blocking means on said door member selectively operable to block movement of said external control member, transmission means, and link means operably connecting said internal control member to said transmission means and connecting said transmission means to said blocking means and to said locking lever, said internal control member being operable upon movement to one of said three positions to move said locking lever to said unlocked position and upon movement to another of said three positions to operate said blocking means to block movement of said external control member.

2. In a vehicle body having a door member swingably mounted thereon for movement between an open position exposing a door opening in said body and a closed position closing said door opening, said door member having a latch member thereon operable to releasably maintain said door member in said closed position and including a locking lever movable between locked and unlocked positions which locking lever automatically returns to said locked position upon movement of said door member to said closed position, a locking lever control arrangement comprising an internal control member, means mounting said internal control member on said door member for accessibility from inside of said body in said closed position of said door member and for movement relative to the latter between at least three distinct positions, an external control member, means mounting said external control member on said door member for accessibility from outside of said body in said closed position of said door member and for movement relative to the latter between at least two distinct positions, means operably connecting said external control member to said locking lever so that movement of the former between said two positions moves said locking lever between said locked and unlocked positions, a blocking member, means mounting said blocking member on said door member for pivotal movement between an unblocking and a blocking position wherein said blocking member prevents movement of said external control member, a bellcrank assembly including first and second levers, means mounting each of said first and second levers on said door member for pivotal movement relative to each other about a common axis of said door member, means on said first and second levers operable to couple said levers together for unitary movement in one direction, a first draft link operably connecting said internal control member and one end of said first lever, a second draft link operably connecting said blocking member and the other end of said first lever, and a third draft link operably connecting said second lever and said locking lever, said internal control member upon movement to one of said three positions being operable to pivot said first and second levers in said one direction thereby pivoting said locking lever from said locked to said unlocked position and upon movement to another of said three positions being operable to pivot said first lever in the other direction thereby pivoting said blocking member into said blocking position to prevent movement of said external control member, and said locking lever upon movement from said unlocked to said locked position being operable to pivot said first lever in said one direction thereby moving said internal control member to a third of said three positions.

3. The locking lever control arrangement as recited in claim 2 further including a lock cylinder housing fixedly secured to said door member, a lock cylinder assembly mounted in said housing for rotation between locking, unlocking and neutral positions, and means operably connecting said lock cylinder assembly and said blocking member so that rotation of the former from said neutral to said locking position pivots said blocking member from said unblocking to said blocking position and rotation of said lock cylinder assembly from said neutral to said unlocking position pivots said blocking member from said blocking to said unblocking position.

4. In a vehicle body having a door member swingably mounted thereon for movement between an open position exposing a door opening in said body and a closed position closing said door opening, said door member having a latch member thereon operable to releasably maintain said door member in said closed position and including a locking lever movable between locked and unlocked positions which locking lever automatically returns to said locked position upon movement of said door member to said closed position, a locking lever control arrangement comprising an internal control member, means mounting said internal control member on said door member for accessibility from inside of said body in said closed position of said door member and for movement relative to the latter between at least three distinct positions, an external control member, means mounting said external control member on said door member for accessibility from outside of said body in said closed position of said door member and for movement relative to the latter between at least two distinct positions, a first transfer lever rotatably mounted on said door member, a second transfer lever fixedly secured to said external control member for unitary movement therewith, said second transfer lever being engageable with said first transfer lever upon movement of said external control member between said two positions to rotate said first transfer lever, a third transfer lever rotatably mounted on said door member, means operably connecting said locking lever to said third transfer lever, a connecting link operably connecting said first and third transfer levers so that movement of said external control member between said two positions is operable to move said locking lever between said locked and said unlocked positions, a blocking member, means mounting said blocking member on said door member for pivotal movement between an unblocking and a blocking position wherein said blocking lever prevents movement of said external control member, a lock cylinder housing fixedly secured to said

door member, a lock cylinder assembly mounted in said housing for rotation between locking, unlocking and neutral positions, means operably connecting said lock cylinder assembly and said blocking member so that rotation of the former from said neutral to said locking position pivots said blocking member from said unblocking to said blocking position and rotation of said lock cylinder assembly from said neutral to said unlocking position pivots said blocking member from said blocking to said unblocking position, a bellcrank assembly including first and second levers, means mounting each of said first and second levers on said door member for pivotal movement relative to each other about a common axis of said door member, means on said first and second levers operable to couple said levers together for unitary movement in one direction, a first draft link operably connecting said internal control member and one end of said first lever, a second draft link operably connecting said blocking member and the other end of said first lever, and a third draft link operably connecting said second lever and said locking lever, said internal control member upon movement to one of said three positions being operable to pivot said first and second levers in said one direction thereby pivoting said locking lever from said locked to said unlocked position and upon movement to another of said three positions being operable to pivot said first lever in the other direction thereby pivoting said blocking member into said blocking position to prevent movement of said external control member, and said locking lever upon movement from said unlocked to said locked position being operable to pivot said first lever in said one direction thereby moving said internal control member to a third of said three positions.