United States Patent [19]

Pickles

[11] **3,899,202**

[45] **Aug. 12, 1975**

[54] **AUTOMOTIVE SIDE DOOR LATCH**

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[73] Assignee: **Ferro Manufacturing Corporation,** Detroit, Mich.

[22] Filed: **Apr. 25, 1973**

[21] Appl. No.: **354,223**

[52] **U.S. Cl.** ... **292/216;** 292/DIG. 24; 292/DIG. 25

[51] **Int. Cl.**[2] **E05C 3/28**

[58] **Field of Search** ..... 292/216, 280, DIG. 24, 292/DIG. 25

[56] **References Cited**

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3,312,489	4/1967	Trudeau	292/48
3,666,305	5/1972	Schlichter	292/48
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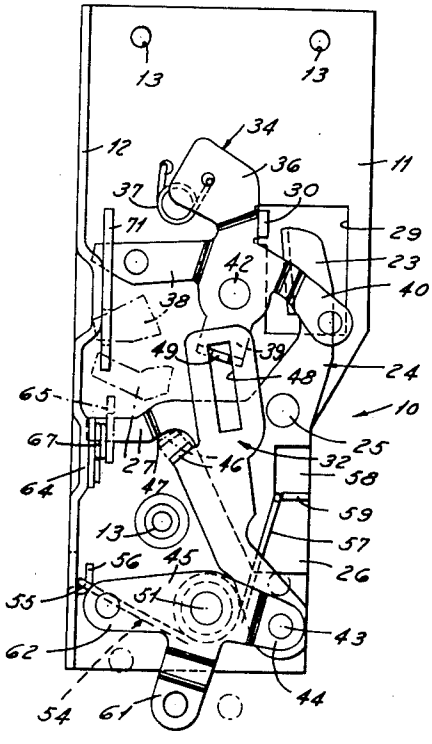
Primary Examiner—Richard E. Moore

Attorney, Agent, or Firm—Whittemore, Hulbert & Belknap

[57] **ABSTRACT**

A plate-like pawl blockingly engages between a pair of forked latch members, which are spring-biased toward one another to a position in which they encircle and latch a fixed automobile door keeper. The blocking part of the pawl is an integral plate component on a dogging arm of a heavy duty sheet metal stamping presenting three angularly divergent arms, the mentioned arm being undogged normally by a vertically shiftable, intermittent latch operator, disconnector and control slide when the lock is in an unlocked, non-freewheeling setting. To this end the slide has a laterally offset operating tab which is engageable for the purpose with an integral offset formation on a second de-dogging kick-off arm of the pawl, thus placing the latter in a latch releasing position. When the slide is cocked a bit transversely of its direction of longitudinal undogging shift, in a pivotal movement about a connection to an outside-operated bell crank, the slide overruns or free-wheels relative to the pawl arm's offset, hence disables the pawl from unlatching the lock. For the purpose of thus cocking the slide, the latter is provided with an elongated slot which receives a laterally offset tang on one arm of a pivoted multi-arm locking lever whereby, upon a swing of that lever in a pawl-disabling and locking direction, the slide is shifted or cocked to its position to overrun the pawl arm offset. Otherwise, the tab of the slide operates to undog the pawl without interference from the locking lever tang, since the slide's slot receiving said tang is elongated, in the unlocked setting, on the direct line of shift of the operator and disconnect slide, hence is idly overrun by the latter. The locking lever is selectively operated by inside remote control and key-operated lever connections. The outside operator is a bell crank type, on an arm of which a bottom portion of the disconnect slide has a fixed, rivet-type pivotal operating connection. An automatic feature is also incorporated to enable the door to be locked without key from the outside.

14 Claims, 7 Drawing Figures



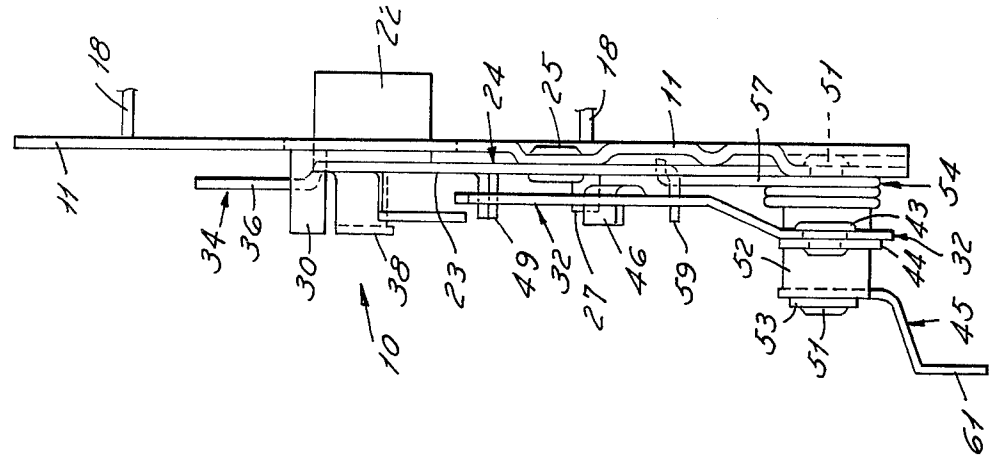


FIG. 3

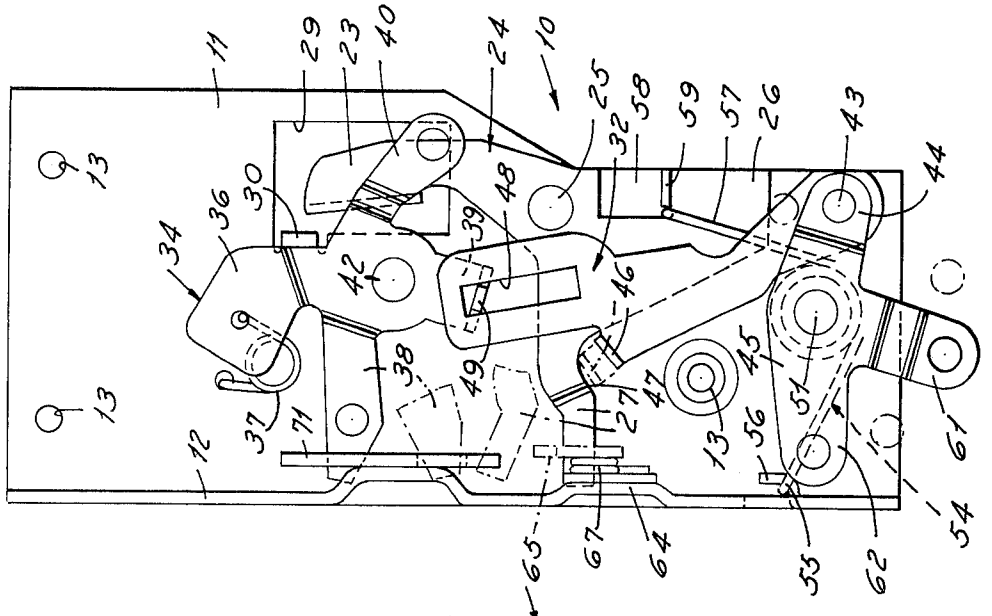


FIG. 1

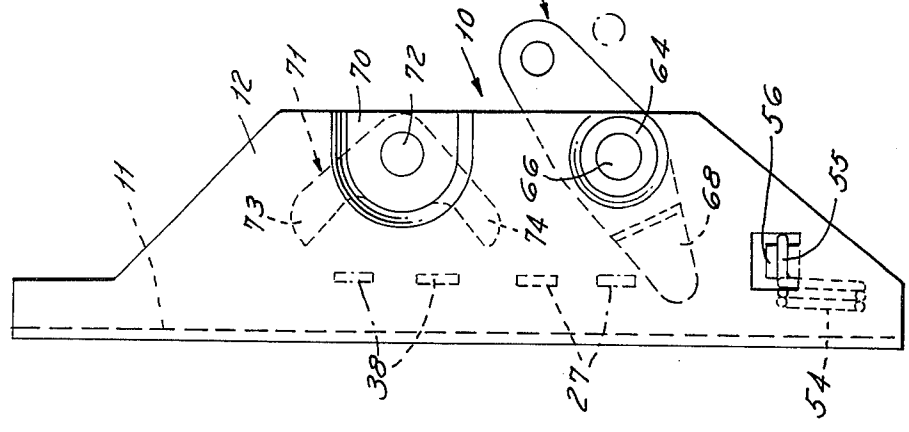


FIG. 2

FIG. 4

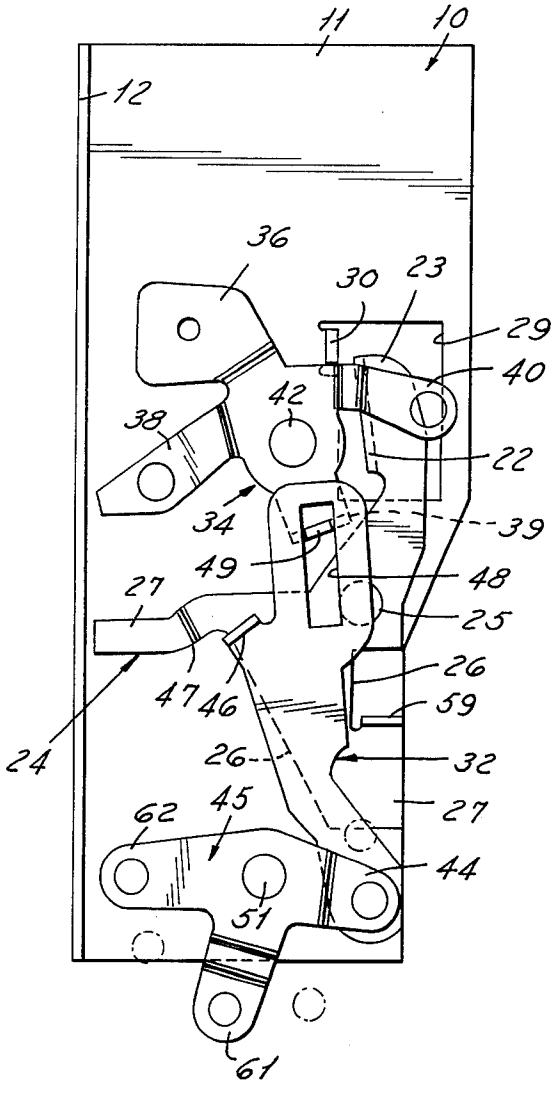

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FIG. 5

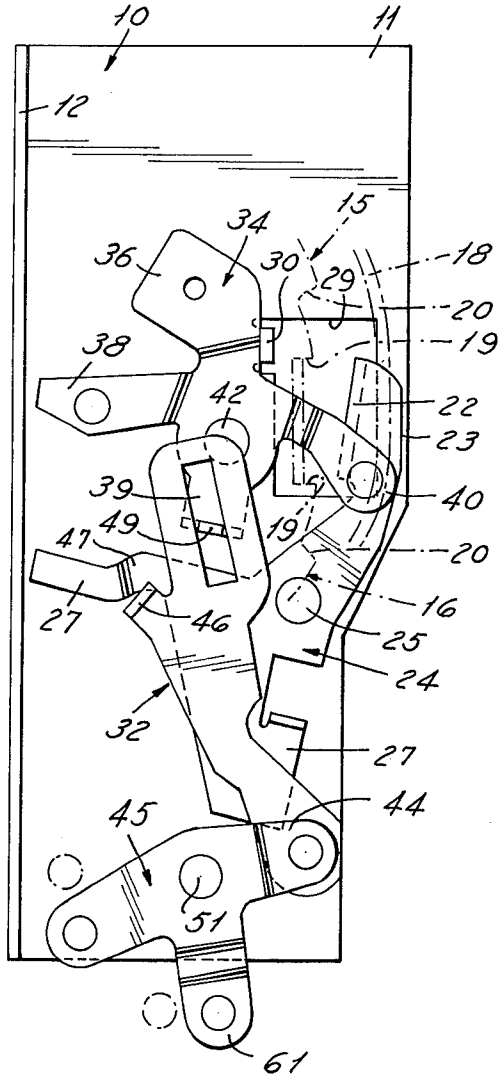
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FIG. 6

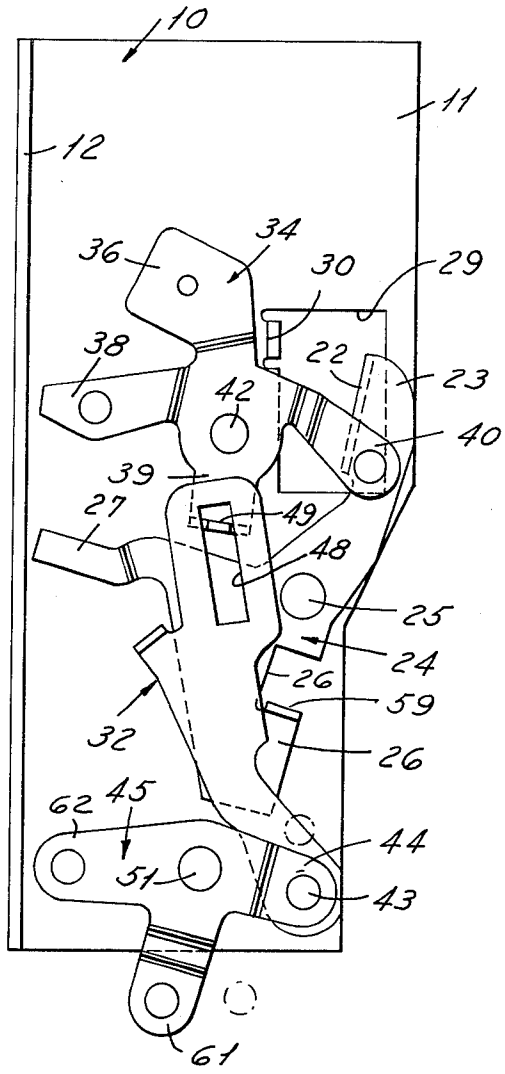
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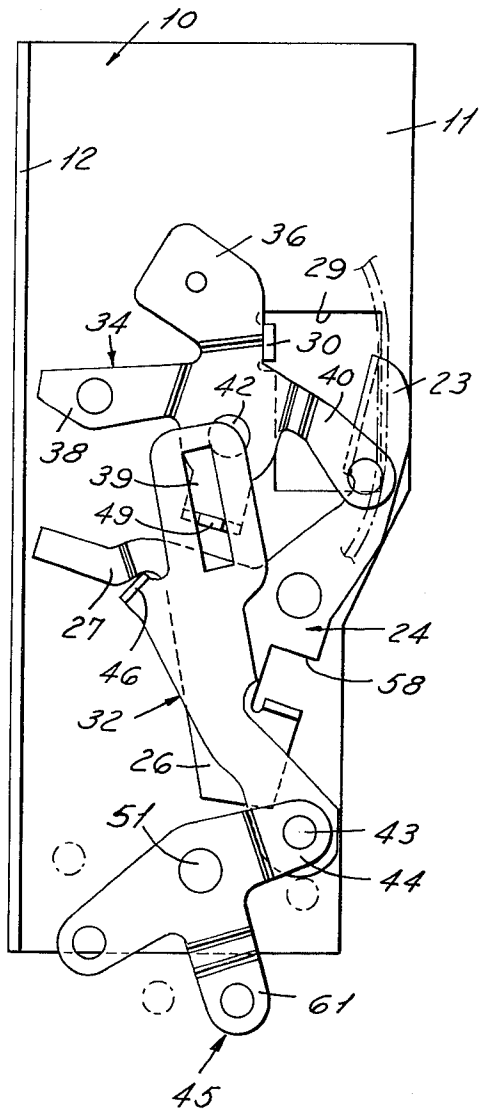
FIG. 7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AUTOMOTIVE SIDE DOOR LATCH

CROSS-REFERENCE TO RELATED APPLICATION

My co-pending application, Ser. No. 207,830, filed Dec. 14, 1971, now U.S. Pat. No. 3,784,241 of Jan. 8, **1974,** discloses a generally similar type of latch or locking construction featuring forked dual jaw type overlapping latch members spring-biased toward a latching position, a locking lever quite similar to that of the present improvement, and a longitudinally shiftable, laterally or transversely cocked intermittent slide controlled by an outside operator. However, certain lost motion connections in that application between the latching pawl and the slide, and between the slide and the outside operator are not found in the lock herein disclosed, being replaced by simpler, fixed pivot arrangements, represented by rivets.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present lock, as fabricated in its entirety of inexpensive stamped parts operatively mounted by simple, inexpensive rivet-type pivot connections, is intended for installation on truck doors; and for that reason it forgoes relatively expensive refinements such as are commonly incorporated presently in passenger vehicle door locks.

2. Description of the Prior Art

The patent to Schlichter, U.S. Pat. No. 3,666,305 of May 30, 1972, is one of a number which disclose a double jaw-type automobile door lock, and is also generally related to the present improvement in respect to a tongue and slot type of freewheel connection between a locking lever and another latch component, but not to an actuator and disconnector slide as in the present invention.

SUMMARY OF THE INVENTION

The improved lock is of an extremely simple construction, incorporating a minimum number of inexpensively stamped lever and slide parts; and the assembly of these parts, typically by rivet-type pivots, is an equally simple and inexpensive matter. The improved lock, insofar as its dual forked jaw and spring biasing means are concerned, presents all of the advantages of the construction of my above-identified application; and other arrangements like the locking lever of that application are carried forward herein without substantial change.

However, pursuant to the present improvement, the multiple arm pivotal blocking pawl of the lock is strongly biased by a torsion spring, which encircles the pivotal axis of the outside operator and anchors on a mounting plate of the lock and on the pawl, towards an automatic kick-off position, enabling the lock to be latched, with the pawl blocking the latch forks, when a conventional inside push button servicing the lock is depressed and the door is swung closed with the outside operator in an unlatching position. A further improvement in the lock resides in the fact that a longitudinal operator and disconnector slide, as directly pivoted on an arm of the outside operated bell crank and shiftable upwards and downwardss by the latter, also carries a laterally offset tab which either engages against an offset formation on a pawl arm to unlatch the pawl or, with the slide cocked somewhat about its outside operator pivot, to overrun the pawl arm offset, the unit thus

being in an overrunning or freewheeling locked condition. In this condition, an elongated slot in the slide enables the latter also to freewheel in relation to the locking lever.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view showing the mounting of operating parts of the lock on a door-mounted plate stamping, positions of the components being depicted in solid line in an unlocked and latched condition of the lock, and in dotted line as they are shifted into positions in which the structure is unlocked and unlatched;

FIG. **2** is an end elevation of the lock as viewed from the left of FIG. **1,** indicating a movement of a pawl arm from a solid line, latched position to a dotted line, unlatching position, as well as a movement of a locking lever arm from a solid line unlock position downward to a dotted line lock position;

FIG. **3** is an opposite end elevational view of the lock of the invention, as from the right of FIG. **1**;

FIG. **4** is a side elevational view similar to FIG. **1,** showing parts of the lock in a latched and locked condition of the latter, in which view (as in those of FIGS. **5, 6** and **7**) certain spring-biased and other components appearing in FIG. **1** have been omitted for clarity;

FIG. **5** is a side elevation showing the lock in release position, i.e., unlocked and unlatched, with the dogging pawl appearing in solid line in its latch fork un-dogging position, and in dotted line in its dogging position;

FIG. **6** is a view similar to FIGS. **1, 4** and **5** of the lock in an automatic kick-off position; and

FIG. **7** is a similar side elevation depicting the lock in travel position as unlocked and unlatched.

DESCRIPTION OF A PREFERRED EMBODIMENT

The improved door lock of the invention, generally designated by the reference numeral **10,** includes a sheet metal stamping having a main plate part **11** and a 90° flange affording a secondary plate part **12**; and plate part **11** is fixedly secured, as at certain punch and boss formations **13** thereof, in a substantially flush relationship to and across the free, outer edge of the door, instanced above as a truck door.

As suggested in dot-dash line in FIG. **5,** a pair of like latch forks **15, 16** are pivotally mounted on main mounting plate **11,** bein enclosed substantially in their entireties in an arcuate housing formation **18** projecting fixedly at 90° from the outer side of plate member **11.** This arrangement of housing and dual latch forks itself constitutes no part of the present invention, but it is in any event more fully illustrated and described in my application identified above. In the manner described therein, the forks **15, 16** are operated against spring bias to releasably latch about a striker or keeper pin (not shown) conventionally affixed to the door frame. They are shown in FIG. **5** as being marginally shaped to provide full latch and safety latch shoulders **19, 20** respectively; and a single torsion spring (not shown) biases the forks **15, 16** respectively, clockwise and counterclockwise away from their latched position in which, per dotted line in FIG. **5,** their latch shoulders **19** engage vertically and oppositely against a part of the pawl of the lock **10,** thus to dog forks **15, 16** in a latched position surrounding the keeper pin of the lock, as fully described in my said co-pending application.

To this end, the latch fork shoulders **19** (and - in the case of a safety latch condition - the shoulders **20**) are held in the door closed and latched position of FIGS. **1, 4** and **5** by a rectangular dogging pawl piece **22** integrally formed as a 90° offset of a rugged pawl arm **23,** which arm is a first integral part of a 3-armed, bell crank-like pawl, generally designated **24.** The latter is pivotally mounted by a rivet **25** on the side of mounting plate **11** opposite the side of forks **15, 16** at a point adjacent the junction of pawl arm **23** with the two other arms **26, 27** or pawl **24.** These are respectively a generally horizontally extending, dedogging kick-off arm and a depending spring-operated arm. The dogging or blocking plate part **22** of pawl **24** extends laterally through a generous size rectangular opening **29** in mounting plate **11,** thus permitting a liberal swing between the positions of part **22** appearing in solid and dotted line in FIG. **5.** A lug **30** is struck and offset 90° from the plate to serve as a stop for a purpose to appear. Appropriate coil tension spring means (not shown) continually urges pawl **24** toward the fork-dogging position shown in FIGS. **1** and **4** and in dotted line in FIG. **5.**

A generally vertically acting control, pawl-actuating and disconnector slide **32** is mounted on the same side of plate **11** as the pawl **24,** i.e., the side of the plate opposite that on which the latch fork structure **15, 16** is located. Slide **32** is an intermittent transmitter component of a latching and locking sub-assembly which further includes a multiple arm locking lever, generally designated **34.**

In the general manner illustrated and described in my application, Ser. No. 207,830, said locking lever **34** is a stamping presenting (a) an upwardly projecting arm or ear **36** (FIG. **1**) apertured to receive a conventional overcenter coil spring **37** which anchors on plate **11,** the part **36** having provision (not shown) to operate locking lever **34** from the usual key-operated cylinder lock of the door; (b) a laterally projecting second arm **38** apertured to receive a connector (not shown) operated in the usual manner from a door molding-mounted push button; (c) a third depending arm **39** whose function is later detailed; and entirely as an option, a fourth angularly disposed arm **40,** which will afford an operating connection as an alternative to the locking lever arm **38** in an installation of lock **10** in a high cab truck. As a feature in common with other simplified mounting provisions of the invention, the locking lever **34** is pivotally mounted on plate part **11** by a headed rivet **42.**

The plural function actuator, disconnect and control slide **32** is a stamping which is considerably elongated in the vertical sense, being pivotally connected by a rivet **43** at its lower end to an offset arm **44** of a 3-arm outside operated bell crank lever **45** in a manner to be described. Medially of its length, the slide **32** carried a 90° offset pawl operating and dedogging tab or ear **46** which, upon upward movement of the slide from a solid line position of FIG. **1** to a dotted line position, engages beneath an integral offset formation **47** of laterally projecting pawl arm **27,** thus to shift said arm to the dotted line position thereof in FIG. **1.**

Slide **32** is provided adjacent its top with a considerably elongated slot **48;** and this slot slidingly receives, in a longitudinal lost motion manner, an ear or tang **49** offset 90° from the arm **39** of locking lever **34,** as further shown and described in my co-pending application identified above.

The outside operated bell crank or lever **45** is pivotally mounted on plate **11** by a double headed rivet **51** which, as best shown in FIG. **3,** extends through a cylindrical, barrel-like stud **52** backing against the mounting plate **11** and spaced at its opposite end from a head of rivet **51** by a washer **53.** The outside operator **45** is fixedly connected medially to the outer end of stud **52;** and (FIGS. **1** and **3**) a strong coil torsion spring **54** medially surrounds and is centered by stud **52.** One projecting arm **55** of spring **54** is offset to anchor on an ear **56** struck from the flanged plate part **12;** and the opposite arm portion **57** of spring **54** is also offset to hook through a rectangular opening **58** stamped in the depending arm **26** of pawl **24,** lying behind a struck-out ear **59** at that opening. Thus torsion spring **54** exerts a continuing strong force on pawl **24** to shift the latter clockwise about its plate pivot at **25,** i.e., from the position of FIGS. **1** and **4** to the position of FIGS. **5, 6** and **7,** in which the pawl is dedogged from between shoulders **19, 19** of FIG. **5.** This occurs in the movement of pawl **24** in kicking off to latch releasing position, per FIGS. **5, 6** and **7.**

An arm **61** of outside operated bell crank **45** is offset and apertured to receive, in a high-cab installation, an appropriate connector (not shown) operated from the usual handle of the door; and bell crank lever **45** also has a third arm **62** optionally connected, in a low-cab installation, to a similar handle or like operator.

As shown only in FIGS. **1** and **2,** the 90° flange plate portion of the lock's mount has an inward boss at **64** at which an inside-operated remote control lever **65** of the lock pivotally mounts, again by a simple headed rivet **66,** with a conventional snap-over spring **67** interposed between the plate part and lever and anchored to each to effect a desired completion of the swing of lever **65** in either rotative direction.

An outer end of lever **65** is apertured to receive an appropriate remote control connection; and an opposite inner end of said lever is laterally offset at **68** (FIG. **2**) to effect engagement from beneath with the integral lateral kick-off arm **27** of pawl **24** in shifting said pawl at its said arm from the solid line, latched position of FIG. **2** to the upward unlatched position appearing in dotted line.

Furthermore, and as is best shown in FIG. **2,** the plate flange **12** is stamped to provide a boss **70** at which a double armed auxiliary locking lever **71** is pivotally mounted by means of a rivet **72.** An upper arm **73** of lever **71,** as key operated from the exterior, swings downwardly into engagement with the lateral arm **38** of locking lever to swing the latter through said arm from the solid line, unlocked position of FIG. **2** to the dotted line locked position therein. Similarly, an integral lower arm **74** of auxiliary lever **71** is shiftable upwardly in engagement with arm **38** to restore locking lever **36** to the solid line locking position.

Commencing with the unlatching operation of lock **10** appearing in FIG. **1,** a counterclockwise operation of outside operator **45** from its solid line position to its next, dot-dash depicted station (the lock being of course in unlocked position), causes slide **32** to shift upwardly and brings its offset ear or tab **46** into the dotted line position of FIG. **1** to engage and operate pawl arm **27** from its solid to its dotted line position. The corresponding setting appears in FIG. **7,** it being noted that locking lever **34** is shown swung counterclockwise about its pivot rivet **42** to the unlocked position. Such

shift of slide **32** in the thus oriented position of the locking lever causes it to overrun at its slot **48** the tang **49** on locking lever arm **39** without interference by the latter because of the linear lost motion; and FIG. **7** shows lock **10** in its unlocked and unlatched travel condition.

FIG. **4** shows the condition of the lock in its dogged or latched and locked setting. It is placed in this setting from the position of its parts shown in FIG. **5** by a push button or key operated counterclockwise swing of locking lever **34**, which causes the tang **49** on lock lever arm **39**, in going to the right per FIG. **4** in engagement in the slide slot **48**, to cam the slide to the right. This brings the slide's actuating ear or tab **46** to a position in which it will not, when the slide is operated upwardly, engage the offset **47** of pawl arm **27**. Instead, it overruns or freewheels relative to said arm, disabling the lock for unlatching; and the idling shift of slide **34** is again accommodated at its slot **48**. The lock remains in the dogging position of the pawl plate **22**.

The unlocked and unlatched setting of the lock **10** represents the condition and position of the parts upon an undogging of the lock from the dotted line position of pawl plate **22** (per FIG. **5**) to the solid line position of that figure, as also shown in FIG. **7**. In this setting, a counterclockwise swing of outside operator **45** has caused slide **34** to shift upwardly, with the result that it has cammed the locking lever tang **49** from the position of FIG. **4** to that of FIG. **7**, shifting the slide **32** from a substantially vertical orientation of its slot **48** to a posiition canted upwardly and to the left as viewed in FIG. **7**. The same orientation can of course be obtained by a direct manipulation of locking lever **34**. The slide tab or ear **46** is again brought directly beneath the offset **47** on pawl arm **27**.

The kick-off position of FIG. **6** results when, after the door's garnish-mounted push button has been depressed the door is closed with its outside operating handle and the lock's lever **45** non-actuated. The heels of the forks **15, 16**, in a spread condition thereof strike the keeper of the vehicle and close about it; and the strong main spring **54** of the lock overcomes the force of the tension spring (not shown) normally biasing pawl **24** toward its fork dogging position, swinging the pawl clockwise (FIG. **6**) about its pivot at **25** to the undogging position. The kick-off is nullified by holding the outside operating handle in an actuated position as the door is closed with the push button depressed. In all of the lock positions appearing in FIGS. **1, 6** and **7**, the upper arm **36** of lock lever **34** engages against the plate lug **30** as a stop.

What is claimed is:

1. In an automotive door lock, a fixed mounting plate, a pawl having a fixed pivotal mount to operate on said plate, said pawl having an operating arm, an operating lever similarly mounted by a fixed pivot on said plate, an intermittent operating slide having a fixed pivotal connection to said operating lever to be operated by the latter, a locking lever having a fixed pivot on said mounting plate, said slide having an actuator element engageable with the pawl operating arm to swing the pawl in a latch-releasing direction, the slide having a lost motion overrunning connection with a part of the locking lever and being engaged at said last-named connection by said locking lever part to shift the slide to a position in which its actuator element fails to engage said pawl operator arm, and spring means acting directly on and between a fixed part of said mounting plate and a part fixed on said pawl, said spring means strongly biasing said pawl about its pivotal plate mount in a latch-releasing direction.

2. In an automotive door lock of the double fork latching type characterized by oppositely swingable latch forks releasably held in a door latching relation to one another, a fixed mounting plate on one side of which said forks operate, a pawl having a fixed pivotal mount to operate on the other side of said plate, said pawl being releasably engageable between said forks and having an operating arm, an operating lever similarly mounted by a fixed pivot on said other plate side, an elongated intermittent operating slide disposed on said other side and having a fixed pivotal connection to said operating lever to be operated by the latter in a longitudinal path paralleling the slide's elongation, a locking lever having a fixed pivot on said mounting plate to swing on said other side of the latter, said slide having an actuator element engageable with the pawl operating arm to swing the pawl in a fork-releasing direction, the slide having a lost motion, longitudinally overrunning connection with a part of the locking lever and being engaged at said last-named connection by said locking lever part to shift the slide to a position in which its actuator element fails to engage said pawl operator arm, and spring means acting directly on and between a fixed part of said mounting plate and a part fixed on said pawl, said spring means strongly biasing said pawl about its pivotal plate mount in a fork-releasing direction.

3. The door lock of claim **1**, in which the fixed pivotings of said pawl, operating lever, slide and locking lever are all through the agency rivet-like components.

4. The door lock of claim **2**, in which the fixed pivotings of said pawl, operating lever, slide and locking lever are all through the agency of simple rivet-like components.

5. The door lock of claim **1**, in which said lost motion overrunning connection of said slide and locking lever part is at an opening in the slide which receives said lever part.

6. The door lock of claim **2**, in which said lost motion overrunning connection of said slide and locking lever part is at an elongated slot in the slide which receives said lever part, the slot affording operating clearance for the slide relative to said locking lever part in the longitudinal overrunning of the slide.

7. The door lock of claim **1**, in which said mounting plate has a 90° bent flange, said flange affording fixed pivotal connections for a pair of members which respectively operate said locking lever and said operating arm of the pawl.

8. The door lock of claim **2**, in which said mounting plate has a 90° bent flange, said flange affording fixed pivotal connections for a pair of members which respectively operate said locking lever and said operating arm of the pawl.

9. The door lock of claim **1**, in which said actuator element of the slide is an integral offset formation of the latter.

10. The door lock of claim **2**, in which said actuator element of the slide is an integral offset formation of the latter.

11. In an automotive door lock, a fixed mounting plate, a pawl pivotally mounted on said plate, said pawl having an operating part, an operating lever pivotally

mounted on said plate, an intermittent operating slide having a connection to said operating lever to be operated by the latter, said slide having an actuator element fixedly mounted thereon and engageable with the pawl operating part to swing the pawl in a latch-releasing direction, and spring means acting directly on and between a fixed part of said mounting plate and a part fixed on said pawl, said spring means strongly biasing said pawl about its pivotal plate mounted in a latch-releasing direction.

12. In an automotive door lock of the double fork latch type characterized by oppositely swingable latch forks releasably held in a door latching relation to one another, a fixed mounting plate on one side of which said forks operate, a pawl pivotally mounted on said plate, said pawl being releasably engageable between said forks and having an operating part, an operating lever pivotally mounted on said plate, an elongated intermittent operating slide having a connection to said operating lever to be operated by the latter in a longitudinal path paralleling the slide's elongation, said slide having an actuator element engageable with the pawl operating part to swing the pawl in a fork releasing direction, and spring means acting directly on and between a fixed part of said mounting plate and a part fixed on said pawl, said spring means strongly biasing said pawl about its pivotal plate mount in a fork-releasing direction.

13. The door lock of claim **11,** in which said actuator element of the slide is an integral offset formation of the latter.

14. The door lock of claim **12,** in which said actuator element of the slide is an integral offset formation of the latter.

* * * * *