July 7, 1953 E. D. DALL 2,644,707

AUTOMOBILE DOOR LATCH

Filed Oct. 29, 1949 4 Sheets-Sheet 1

Fig. 3

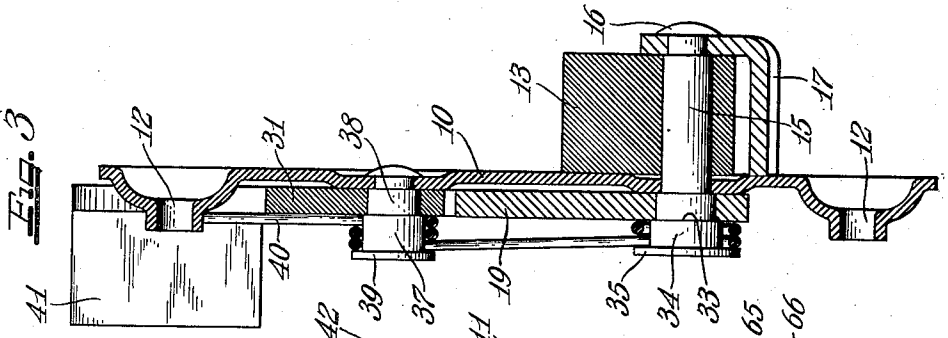


Fig. 1

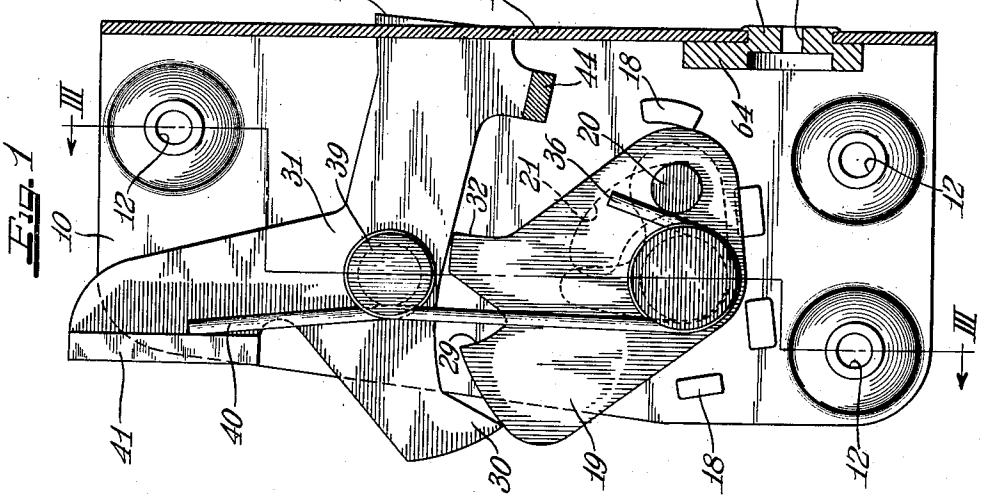
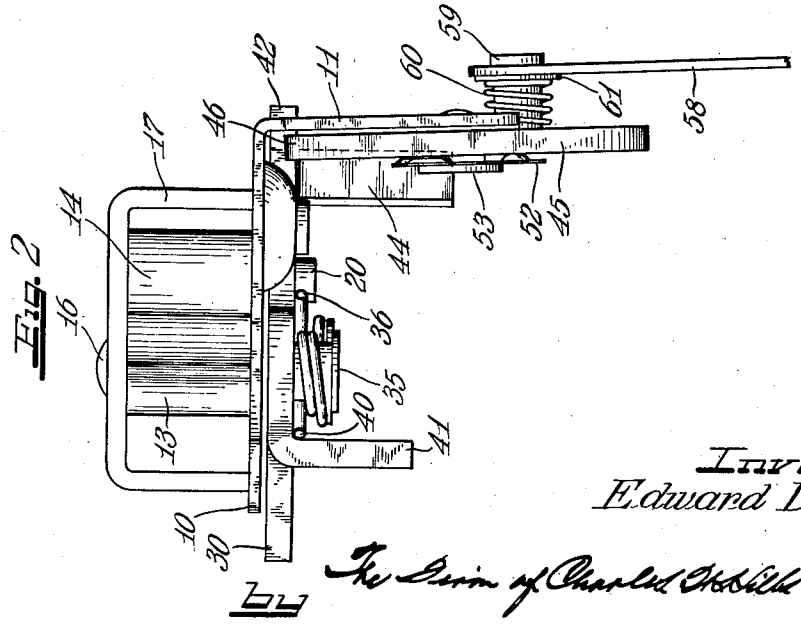


Fig. 2



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July 7, 1953 E. D. DALL 2,644,707

AUTOMOBILE DOOR LATCH

Filed Oct. 29, 1949 4 Sheets-Sheet 2

Fig. 5

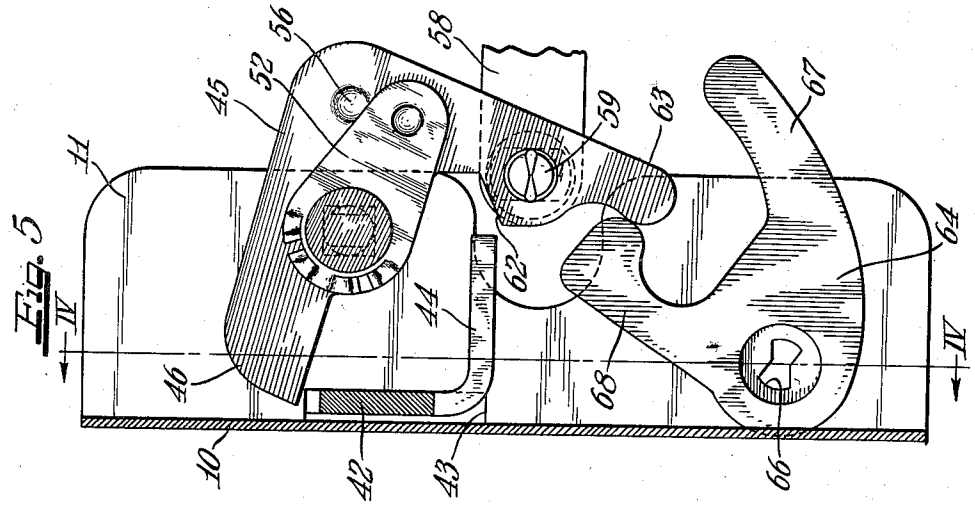
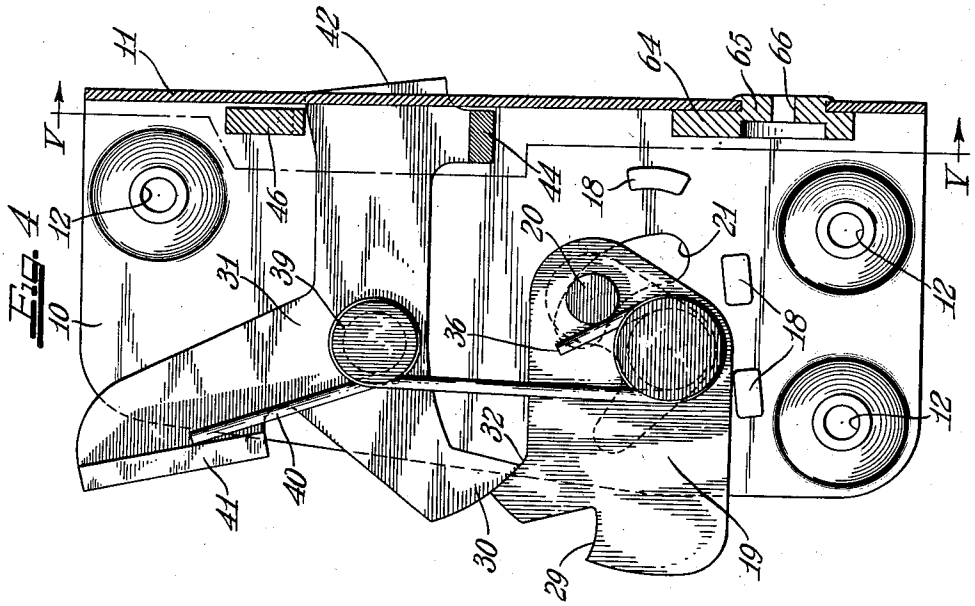


Fig. 4



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July 7, 1953 E. D. DALL 2,644,707

AUTOMOBILE DOOR LATCH

Filed Oct. 29, 1949 4 Sheets-Sheet 3

Fig. 7

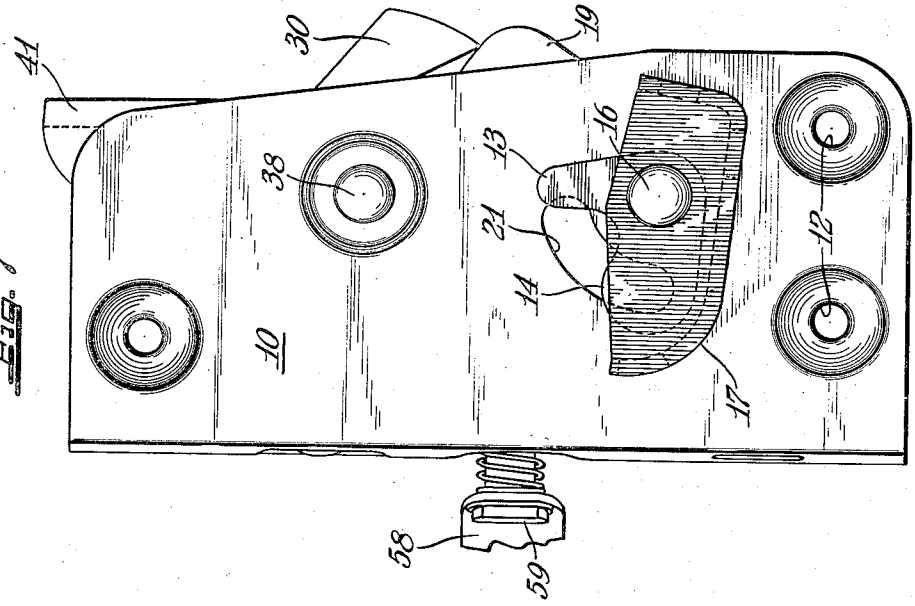
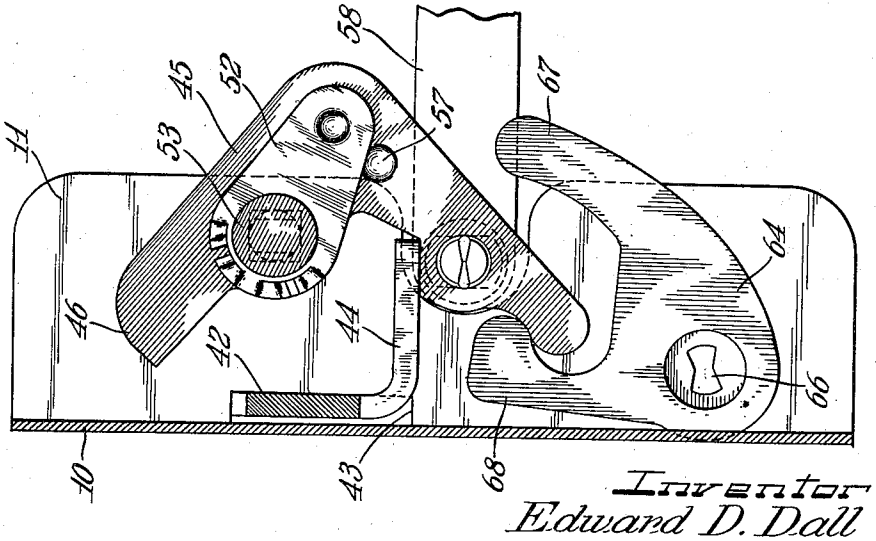


Fig. 6



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July 7, 1953 E. D. DALL 2,644,707

AUTOMOBILE DOOR LATCH

Filed Oct. 29, 1949 4 Sheets-Sheet 4

Fig. 10

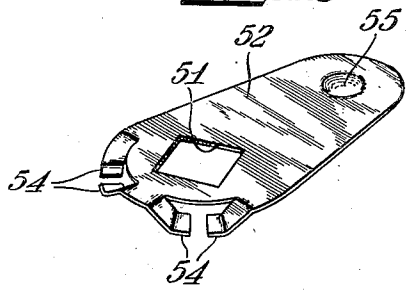


Fig. 11

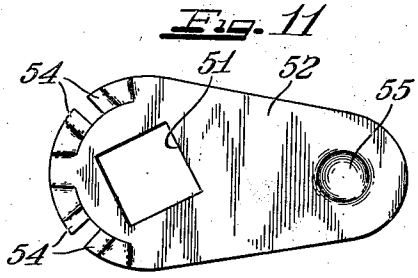


Fig. 12

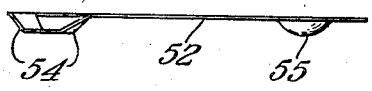


Fig. 13

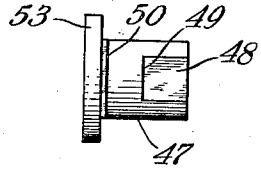


Fig. 14

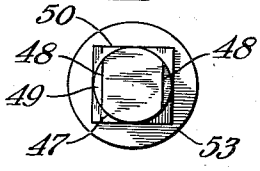


Fig. 8

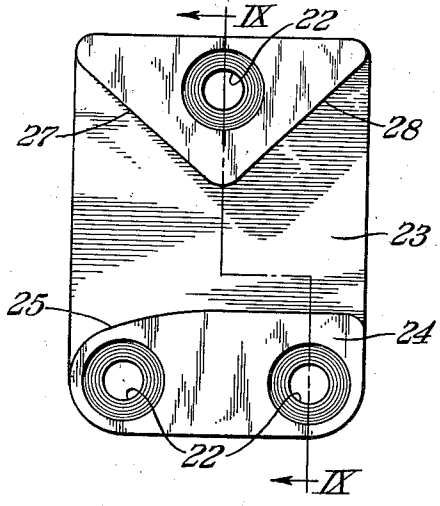
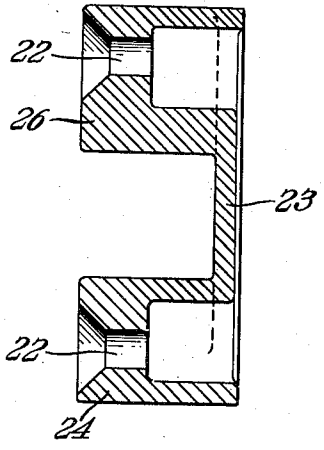


Fig. 9



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2,644,707

UNITED STATES PATENT OFFICE

2,644,707

AUTOMOBILE DOOR LATCH

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Application October 29, 1949, Serial No. 124,355

3 Claims. (Cl. 292—216)

1

This invention relates to improvements in automobile door latches of the type which employ a rotary bolt.

One of the objects of the invention is to provide an improved door latch having an exceptionally simple and sturdy design, yet possessing numerous functional features and advantages currently desired for use in automobile door latches.

Another object of the invention is to provide in a rotary door latch a ratchet anad pawl mechanism for holding the rotary bolt in latched position, wherein a single element pivotally mounted provides the pawl feature and also is acted upon by the outside and the inside handle mechanism for releasing of the pawl.

Another object of the invention is to provide in combination with the foregoing described ratchet and pawl mechanism an inside release member which serves also for locking the pawl against release from the outside.

Other objects and advantages of the invention will be mentioned specifically hereinafter, or will become apparent from a perusal of the following specification in which a preferred embodiment of the invention is described for illustrative purposes.

On the drawings:

Figure 1 is a side elevation, partly in section, viewing the latch mechanism of this invention from the inside surface thereof, showing the device in unlatched position;

Figure 2 is a top plan view of the same latch mechanism;

Figure 3 is a vertical sectional view on the broken line III—III of Figure 1;

Figure 4 is a vertical sectional view on broken line IV—IV of Figure 5, showing the latch mechanism in fully latched position;

Figure 5 is a sectional view on the broken line V—V of Figure 4;

Figure 6 is a sectional view taken at the position of the line V—V of Figure 4, but showing the door latch in its locked condition;

Figure 7 is a side elevation, viewing the latch mechanism from the outside or door edge position and showing the rotary bolt in unlatched position;

Figure 8 is a side elevation of a keeper preferably employed with the latch mechanism;

Figure 9 is a sectional view on the broken line IX—IX of Figure 8;

Figure 10 is a perspective view of a spring steel plate employed in the latch;

Figure 11 is a top plan view of the same plate;

Figure 12 is an edge view of the same plate;

Figure 13 is a side elevation of the post on which the steel plate is to be mounted; and

Figure 14 is an end view of the same post.

As shown on the drawings:

2

Referring further to the drawings, this door latch is assembled on a casing plate formed preferably from a single sheet of metal bent to provide what shall herein be termed as two plates, the plate 10 which is mounted at the free edge of the door being termed the rotor plate, while the other portion of the casing, substantially at right angle to the rotor plate, being known as the inside latch plate 11. The countersunk holes 12 shown in the rotor plate are provided to enable this casing to be secured to the door edge by means of screws.

The rotary bolt, as shown in Figure 7, is provided with a striker arm 13 and a latching arm 14, and is pivotally supported on a post 15, the outer end 16 of which is riveted over the outside surface of the rotor housing 17, the housing being secured to the rotor casing plate in any suitable manner as, for example, by providing a plurality of projections such as 18 (Figure 1) which extend through apertures in the casing plate and are swaged over on the inside surface of the casing to hold the housing firmly in place.

The inner end of the post extends through the rotor plate 10 and furnishes a pivotal support for a ratchet plate 19 which is connected to the rotary bolt by means of a pin 20 extending through a curved slot 21 in the rotor plate. The pin 20 is fixed in the latching arm of the rotary bolt (Figure 4) and, therefore, causes the bolt and the ratchet plate to move in unison.

A keeper with which this rotary bolt cooperates is illustrated in a preferred form in Figures 8 and 9 and is intended to be secured to the door post by means of screws passing through holes such as 22. Integrally formed with the base plate 23 is a lower abutment 24 having an inclined surface 25 upon which the rotor housing slides when the door is being closed. An upper abutment 26 is provided with an outer strike surface 27 and an inner latching surface 28. When the door is being closed the striker arm 13 will contact the strike surface 27 and as the door further closes the latching arm 14 of the bolt will rotate up into such a position that if the door tends to open the latch arm will engage the latching surface 28 and prevent the door from opening, provided that the ratchet plate at the time is held against unlatching movement.

The ratchet plate 19 is provided with a safety notch 29 to be engaged by the nose 30 of the pawl 31 when the door is partially closed. When the door is fully closed the nose 30 of the pawl will engage the shoulder 32 on the ratchet plate and prevent unlatching rotation of the rotary bolt.

A shoulder 33 on the bolt pin 15 engages the

side of the ratchet plate, while wrapped around the enlarged portion **34** of this pin inside the further enlarged head **35** is a spring the lower end **36** of which rests against the pin **20**. An intermediate portion of this spring is wrapped around the enlarged portion **37** of a post **38** and held thereon by the head **39**, while the upper end **40** of the spring engages a lateral flange **41** on the pawl **31**, which is pivotally supported on the post **38**. As is apparent from the drawings, the spring therefore serves normally to tend to rotate the rotary bolt to unlatched position and to apply pressure on the pawl to tend to rotate it in a counter-clockwise direction as it is viewed in Figure 1. Hence, as the bolt is rotated toward locked position by the keeper during the closing movement of the door, the spring will successively rotate the nose **30** of the pawl **31** first into the notch **29** and later against the latching shoulder **32** of the ratchet plate.

The flange **41** on the pawl provides a surface against which pressure may be applied from the outside of the door for releasing the ratchet and pawl mechanism. Either a push button mounted in the outside wall of the door may be employed, or a pivoted handle may be mounted in the outside of the door and an inwardly rotating nose, or projection, on it may be caused to strike against the flange **41** for the purpose of releasing the pawl. Push buttons and rotating handles of the character mentioned are well known in the automobile industry, hence need no description herein.

The innermost end **42** of the pawl extends into a vertical guide slot **43** which is provided in the casing plate **11**. Adjoining the inner end of the pawl is a laterally extending flange **44** which is utilized in connection with means for locking this latch mechanism in fully latched position.

The inside release lever for connection with the inside door handle is constructed and operated as follows: A bell crank **45** constituting a release lever is provided with a finger **46** which, when rotated in a counter-clockwise direction as viewed in Figure 5, will strike the top of the end portion **42** of the pawl **31** and rotate the pawl to disengage it from the ratchet plate if the door be in either safety latched or fully latched position.

This release lever is rotatably mounted upon the cylindrical portion **47** of the post shown in Figures 13 and 14. The post extends through the casing plate **11** through a hole punched therethrough which is non-circular in shape and has two straight vertical margins shaped snugly to engage the flat sides **48** adjoining the limiting shoulders such as **49** which are provided on this post. The extreme right end of the post, as viewed in Figure **13**, is pivoted over on the outside of the plate, and thus the post is held against rotation and axial movement. A thin square shoulder **50** is provided to engage snugly the square aperture **51** provided in the spring steel plate **52**, the innermost enlarged head **53** on the release lever post serving to hold the spring plate snugly against the inside surface of the release lever. A plurality of offset spring fingers, such as **54**, are provided on the spring plate to supply pressure against the release lever while an inwardly concaved projection **55** on the spring plate is positioned for engagement with either of the cooperating depressions **56** and **57** on the release lever as shown respectively in Figures 5 and 6. Because it is anchored on the square shoulder **50** of the non-rotatable pivot post **47**, the spring plate **52** cannot rotate, hence whenever the release lever is moved into normal unlocked position, as shown in Figure 5, the spring plate will serve to hold it in that position, while if it is roted to the locking position shown in Figure 6, the spring plate engages the depression **56** and will frictionally hold the release lever in locked position.

For rotating the release lever there is provided a remote control link **58** having a slot in its forward end for engagement with a post **59** fixed on the release lever. A spring **60** presses a washer **61** against the link **58** which prevents rattling of this mechanism.

Since inside handles connected by a remote control link mechanism to door latches are well known, the details of construction of such an inside door handle need not be shown herein, it merely being understood that any suitable handle may be employed as long as the handle is so pivoted that it will permit the release lever and its spring plate **52** to retain the release lever in locked position as shown in Figure 6, or in a neutral position as shown in Figure 5.

A shoulder **62** is provided on the arm **63** of the bell crank and is so located that when the release lever is rotated from the neutral position shown in Figure 5 to the locked position shown in Figure 6 this shoulder **62** will move in under the flange **44** which is integral with the pawl **31**. Thus, release of this latch mechanism by means of the outside door handle, or outside button, may be prevented. It is apparent that when the latch mechanism is in the locked position, as shown in Figure 6, the normal operation of the inside handle to open the door will first unlock the mechanism and then release the pawl **31** from its holding engagement with shoulder **32** of the ratchet plate **19**.

While all of the doors on an automotive vehicle may be provided with a key-controlled lock if desired, one of them at least should be, and for that purpose I provide a key-controlled locking member **64** formed with a pivot boss **65** rotatably engaged with the latch casing plate **11**, as illustrated in Figure 1, thus to pivotally support this locking member on the casing. An aperture **66** is provided in the boss to be engaged by the shank of a key-controlled lock, which may be of any suitable construction, such as are well known in the automobile industry.

It is apparent, therefore, that, by means of a key operated from the outside, the locking plate **64** may be rotated counter-clockwise as viewed in Figure 5, causing the arm **67** to engage the arm **63** on the inside release lever and rotate that lever into the locked position as shown in Figure 6. After the latch mechanism is locked, clockwise rotation of the lever by means of a key will unlock the release lever. It is apparent also that when the latch mechanism is in locked position the operation of the inside handle to unlatch the door will not only move the release lever out of locked position, but will also restore the locking plate **64** to its unlocked position.

Likewise, locking of the latch mechanism by means of the inside handle will serve to move the lock plate **64** into its locked position. When the inside handle moves the inside release lever **45** into locked position, the arm **63** on the release lever will press against the arm **68** on the locking plate and carry the locking plate into locked position. Thereafter, reverse movement of the locking plate can be obtained either by means of a key or the inside handle.

By comparing the position of the flange **44** as shown in Figure 1 with its position as shown in

Figures 4 and 5, it will be perceived that the shoulder 62 of the inside release lever can be moved under flange 44 only when the rotary bolt is in fully latched position, which means that the door must be closed to that position.

The embodiment herein described is simple in design, rugged in construction, and economical to manufacture, and is herein shown in its preferred form. However, it should be understood that the invention is susceptible of some variation and that modifications and variations may be effected therein without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In a door latch mechanism, a latch casing plate, a rockable latch bolt on the outside of said plate having two angularly disposed arms for successive cooperation with a keeper, one of which is biased into a generally upright position when the door is opened and the other of which is moved into a generally upright position by engagement of said one arm with a keeper when the door is closed, a ratchet plate on the inside of said casing plate mounted for rocking movement with said latch bolt about an axis coaxial with the axis of rocking movement of said latch bolt, a pawl member pivotally mounted on said casing plate for cooperation with said ratchet plate, said ratchet plate having two spaced detent shoulders, one of which forms a safety latch shoulder when engaged with said pawl member upon partial closing of the door and the other of which holds the door in a fully closed position when engaged with said pawl member, said pawl member also having an arm extending from its pivotal axis in a direction opposite from said ratchet plate for engagement with an outside operator to release the latch, and a common spring having engagement with said pawl member and said latch bolt and biasing said pawl member into engagement with said ratchet plate and also biasing said latch bolt with said one arm thereof in an upright position, said one arm pivoting said ratchet plate against said spring upon engagement with a keeper and moving said ratchet plate into position to be progressively engaged by said pawl on said detent shoulders during door closing movement and to be positively held in engagement therewith by said spring acting on said latch bolt, and said spring also acting on said latch bolt in a direction to maintain said latch bolt in engagement with the keeper and to take up on the latch.

2. In a door latch mechanism, a latch casing plate, a pin rotatably mounted on said plate and extending therethrough, a rockable latch bolt mounted on the outside of said pin for movement therewith, said latch bolt having two angularly disposed arms for successive engagement with a keeper upon door closing movement, a ratchet plate secured to said pin on the inside of said casing plate for rotation with said latch bolt, an arcuate slot formed in said latch plate in communication with said latch bolt, a pin on one arm of said latch bolt and extending therefrom through said slot to the inside of said latch plate, said ratchet plate having two spaced detent shoulders, one of which affords a safety latch when engaged by said pawl and the door is partially closed, and the other of which positively

restrains said latch from moving in a door opening direction when engaged by said pawl and the door is fully closed, said pawl also having an arm extending from its pivotal axis for engagement with an outside operator to release said pawl from said ratchet plate, and a common torsion spring mounted intermediate its ends on said casing plate and having engagement with said pawl at one of its ends and biasing said pawl into engagement with said ratchet plate, and also having engagement with said pin on said latch bolt at its opposite end, and biasing said pin into engagement with one extremity of said slot and the arm of said latch bolt spaced from said arm having said pin thereon in an upright position, to rotate said ratchet plate against said spring into position to be positively engaged by said pawl on said detent shoulders during door closing movement and upon engagement of said last mentioned upright arm with the keeper.

3. In a door latch mechanism, a latch casing plate, a pin rotatably mounted on said plate and extending therethrough, a rockable latch bolt secured to said pin on the outside of said latch casing plate having two angularly disposed arms for successive cooperation with a keeper, one of which is biased in a generally upright position when the door is open and the other of which is moved into a generally upright position by engagement of said one arm with a keeper when the door is closed, a ratchet plate secured to said pin on the inside of said casing plate for movement with said latch bolt and having detent means thereon, a second pin on said casing plate spaced from said first pin, a pawl member pivotally mounted on said second pin for engagement with said ratchet plate, and having a nose spaced from said pin in one direction and adapted to selectively engage said detent means on said ratchet plate, said pawl member having an arm extending from said pin in an opposite direction from said nose for engagement with an outside operator to release said nose from said ratchet plate, an arcuate slot in said latch casing plate communicating with said latch bolt and ratchet plate, a pin extending through said slot and mounted on said other arm of said latch bolt, and a common torsion spring mounted on said second pin and engageable with said arm of said pawl member at one end and with said last mentioned pin at the other end, and biasing said latch bolt with said one arm in an upright position when the door is open and maintaining said other arm in engagement with the keeper when the door is closed and to take up on the latch, and also biasing said nose and ratchet plate into engagement with each other.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,738,338	Wells	Dec. 3, 1929
2,034,363	Wells	Mar. 17, 1936
2,198,548	Marple	Apr. 23, 1940
2,480,688	Allen	Aug. 30, 1949
2,499,111	Roethel	Feb. 28, 1950
2,552,815	Roethel	May 15, 1951
2,557,468	Roethel	June 19, 1951
2,569,047	Endter	Sept. 25, 1951