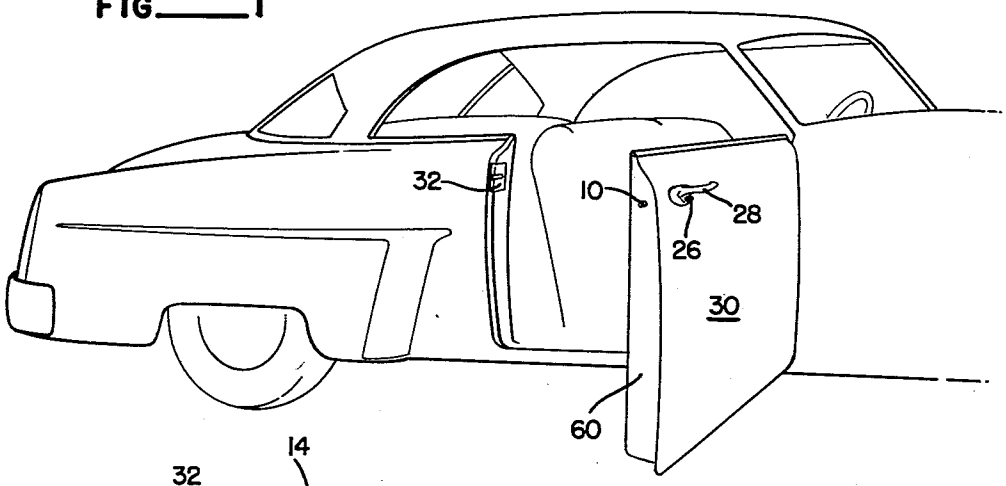
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ANTI-RATTLE DOOR LATCH

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FIG. 1



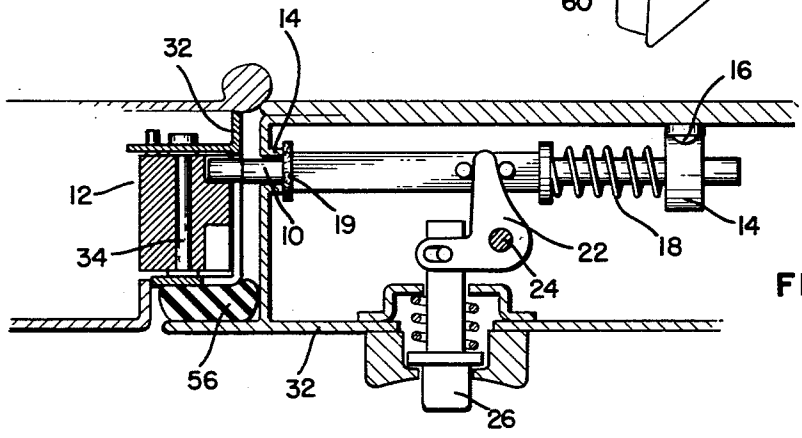


FIG. 2

FIG. 4

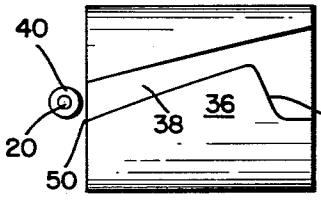


FIG. 3

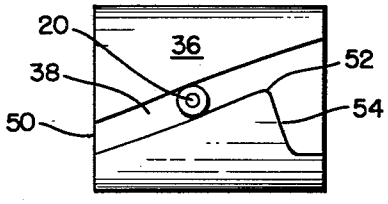


FIG. 5

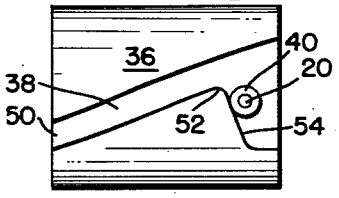
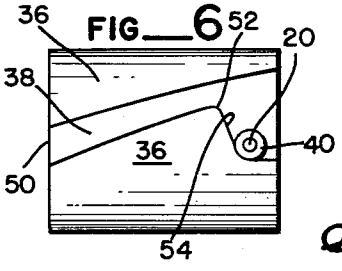


FIG. 6



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FIG. 7

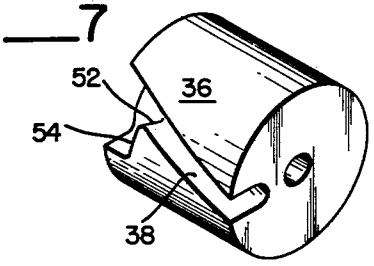


FIG. 8

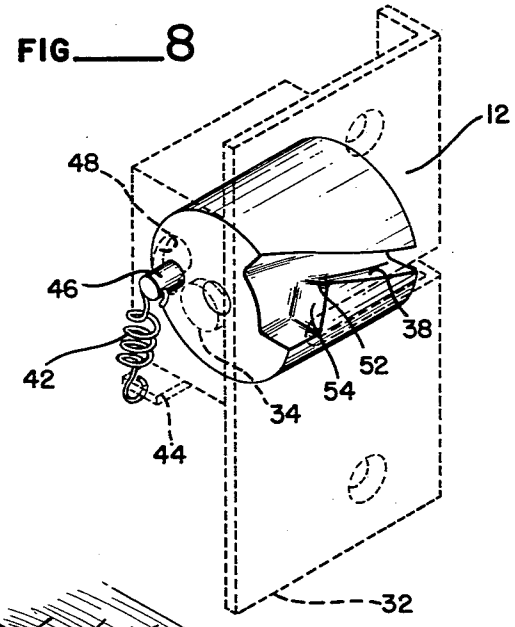
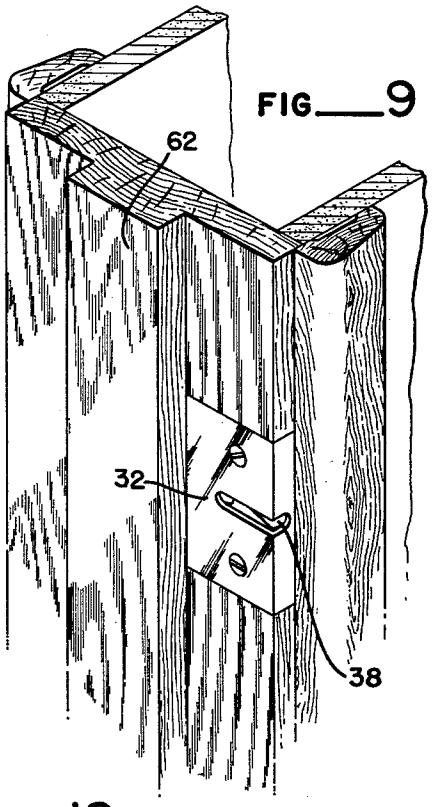


FIG. 9



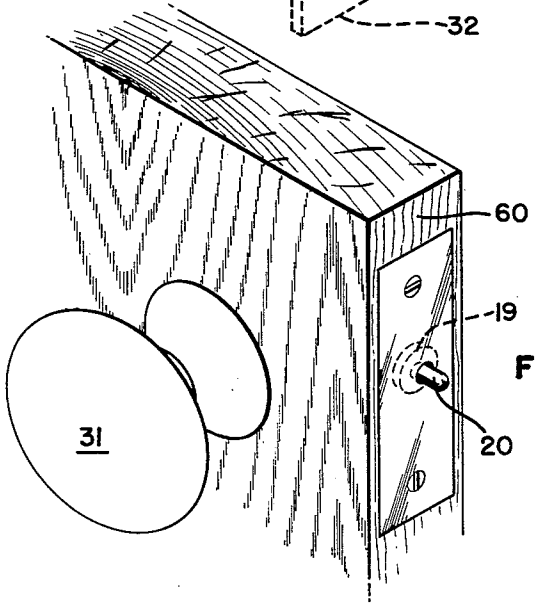


FIG. 10

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2,715,542

ANTI-RATTLE DOOR LATCH

Otis O. Gould, Portland, Oreg., assignor of one-half to Wayne C. Harrigan, Seattle, Wash.

Application December 29, 1952, Serial No. 328,398

6 Claims. (Cl. 292—341.15)

This present invention relates to the general class of door latches and while it may be used for any type of door or gate it is particularly adaptable to automobile doors due to the fact that it is both silent and secure in its locked position. This door latch consists essentially of a sliding detent which engages a grooved cam cut in the outer surface of a roller which is revolvable and is mounted with its axis parallel to the movement of the detent at the time the door is closed.

Many types of door latches have been conceived, usually each latch being designed with some particular purpose in mind. In this present instance this door latch is particularly adapted to doors and automobiles, or on boats where vibration is more or less constant and where it is desirable to insure maintaining the door in a closed position at all times. In this present invention the rotary lock movement is held against the bolt or detent, by spring action, which tends to rotate the bolt and the final locking is secured on a slight reverse inclined surface so the closure tends to seat more fully under conditions of vibration and this same characteristic enables the same to compensate for wear or particularly for the crushing, through use, of the various sealing means used on many of the automotive doors.

The principal object of this present invention therefore is to provide a door latch which is very simply constructed and in which the locking member is resiliently held in position so that there will never be any slack developed and thus a rattle-proof latch is provided.

A further object of this invention is to provide a double-sloped grooved cam so arranged that the locking bolt can, with very little pressure, operate the rotary lock member, and when the limit of rotation is achieved, the bolt descends on a steeply pitched surface which provides locking security without coming to the bottom of the possible travel except under conditions of extreme wear so that a long life can be expected from this latch.

A further object of this mechanism is to provide a latch mechanism that is certain in operation and which can be opened with the minimum of applied effort.

A further object of this invention is to provide a simple latch mechanism that can be used under all the various conditions where it is desired to latch a door.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is a perspective view of a portion of an automobile showing the general location of the components of the present latch member when in use;

Figure 2 is a typical horizontal sectional view through a latch mechanism as believed to be most suitable for use on automotive equipment;

Figures 3, 4, 5 and 6 are diagrammatic views illustrating the normal sequence of engaging this latch and showing it in its final locked position;

Figure 7 is a perspective view illustrating the rotary lock member;

Figure 8 is a perspective view of the rotary lock member but illustrating the opposite end from that shown in Figure 7, and showing a typical face-plate housing in dashed lines;

Figure 9 is a perspective view illustrating a door casing, partly in section, employing this invention and showing the external portions of the face-plate and how it is adapted to a conventional door as used in housing; and

Figure 10 is a fragmentary perspective view, partly in section, showing the locking bolt and turn-knob units as mounted on a door and as used in conjunction with the door framing of Figure 9.

Referring more particularly to the disclosure in the drawings, the numerals **10** and **12** designate respectively the lock bolt and the rotary locking member which constitute the principal parts of this present door latch mechanism. The bolt **10** is normally provided with spaced bearings as **14** and **16** which insure the axial positioning of bolt **10** and provide the necessary means for guiding the same as it is reciprocated along its axis during the unlocking operation. The bolt preferably is urged outwardly as by means of compression spring **18** and is seated against bearing **14** on some cushioning member as the fiber washer indicated at **19**. Some convenient means is employed to retract the bolt when it is desired to unlatch or unlock the mechanism. One form of this device is illustrated in Figure 2 in which a bell crank **22** is disposed upon a fixed pivot **24** and operated by a spring-back push button **26**, button **26** thus actuating the bolt **20** by means of the spaced pins **21**. This is normally employed in conjunction with some form of handle as that illustrated at **28** so that the door **30** after being unlatched may be conveniently opened. It will be apparent, it is believed, if this latch mechanism is employed on house doors and the like that any of the various turn knob mechanisms **31**, as illustrated in Figure 10, generally may be employed.

Mounted fixedly within the body framework, or the door frame in the case of a building, is the housing member **32**. Within the housing **32** is provided a lined bearing for an axle or pin **34** and upon this pivot is mounted the rotary lock member **36**. Member **36** may be made of any suitable material and a preferred form is illustrated in Figures 2, 7, and 8. It is to be noted that it is generally cylindrical in form, having the grooved cam **38**. Grooved cam **38** is of a size to accept the end of bolt **20**. It has been found desirable under certain circumstances to provide a roller engaging member as **40** secured on the end of bolt **20** so that friction may be reduced to a minimum. It will be noted from the various views, particularly in Figures 3 through 6 that groove **38** is angularly disposed with respect to the generating line of cylinder **36**. Consequently as the end of bolt **20** engages groove **38** and as bolt **20** is fixed, except for its ability to reciprocate along its axis, the resultant action is to revolve member **36** about pin **34**. The revolving of member **36** is resisted to a degree by some form of spring action. In Figure 8 a convenient arrangement is shown in that a tension spring **42** is employed. This spring is anchored at one end to a lug **44** formed as part of housing **32** and its other end is secured to an outstanding detent or post **46** which is fixedly secured to member **36** and preferably projects outwardly through an arcuate slot **48** formed in one wall of housing **32**. In this manner a convenient limiting means is provided so that the outer end **50** of groove **38** will always be accurately positioned for the reception of bolt **20**.

It will be noted in Figures 3 and 4 that the movement of bolt **40** to the right, as viewed, has revolved mem-

ber **36** partially as roller **40** progresses up through groove **38**. Finally roller **40** passes over the peak **52** of the cam surface and descends down the inclined lock surface **54**. It is to be understood in this operation that actually bolt **20** is fixed in its horizontal position and apparent movement of roller **40** with respect to the Figures 3 through 6 is caused by the rotation of the lock member **36**, first by the camming action of detent **20** and finally by action of spring **42**. The position shown in Figure 5 is probably the most desirable lock position for this latch mechanism when newly installed and the displacement from the position of roller **40** in Figure 5 to that shown in Figure 6 is sufficient to accommodate the latch to all normal wear over an extended period and also to take care of any permanent set that may occur in the packing or sealing strip as **56** which is commonly found in automotive type of doors. Such a strip is usually of rubber or some rubberlike material which has a dual function of sealing the opening so that tight engagement of the door and frame is not necessary, it acts as a cushion in the closing operation, and further prevents rattling which is so common when vibration or road jolts occur. The exact angle of surface **54** is normally a matter of design to suit the intended use and is somewhat a function of the operating conditions and strength of the spring employed to revolve member **38**. Experience has shown that the best results are obtained in normal operating conditions with the included angle between surface **54** and the adjacent end surface of member **36** from 15 degrees to 30 degrees and for the purpose of the claims this range defines a "small angle" between these surfaces. The included angle between groove **38** and the line of generation should be from 10 degrees to 30 degrees for best results and for the purpose of the claims this range defines a "small angle" in this relationship.

Method of operation

Assuming that the door upon which this mechanism is employed is open, it will be found that spring **18** has positioned the extreme end of bolt **20** outwardly so that it extends beyond the door face **60**. When the door is closed and begins to meet its complementary frame, the outwardly extending end of bolt **20** is engaged in groove **38** which is in effect a grooved cam. This sequence of operations shown in Figures 3, 4, and 5 takes place as the door is pushed into the closed position. As bolt **20** is fixed about its longitudinal axis the action is to revolve the rotary member **36** until finally bolt **20** reaches the descending locking surface **54** and comes to rest. In this position the spring **42** of course is tending to rotate member **36** so that the bolt would tend to go further down on surface **54**. It is arrested in this movement however by the compression of the sealing strip **56** or in the case of a door frame in a building, by the door stop member **62**. While in use on automobile doors the compression of sealing strip **56** may allow the bolt **20** to come to rest at the bottom of cam surface **45**, as shown in Figure 6, which is the neutral or starting position of roller **36**. In a household door however the resilient sealing strip is not present and the door is in tight contact with the door stop **62** when the bolt and roller are in the relationship shown in Figure 5. In this position the roller **36** is partially rotated so that the outer end **50** of groove **38** is below the slot in housing or cover plate **32** which in effect closes it off. When it is desired to open the door, the operator through such means as shown in Figure 2 or Figure 10, retracts bolt **20** so that it is no longer in engagement with the rotary member **36** and the door can then be freely swung open. Very little effort is required to open this latch mechanism due to the fact that the spring tension on member **36** need not be vevry great, a matter of two or three pounds of applied force being adequate to securely latch the mechanism and maintain it in its locked position. It therefore follows that both the closing and opening of this locking mechanism can be operated with a very minimum of effort, the principal effort being required in unlocking is the compression of spring **18** which again can be relatively light.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of an anti-rattle door latch.

Having thus disclosed my invention, I claim:

1. A movable keeper for a door latch positioned in one of the two abutting members consisting of the closing edge portion of a door and the adjacent jamb and the other abutting member having a bolt, comprising: a lock housing positioned in said one abutting member having a bolt-receiving groove in its face having an open entrance end at the edge of said jamb which the bolt approaches in closing; a substantially cylindrical rotary locking member journaled in said housing to rotate about a horizontal axis which is normal to the longitudinal axis of said bolt, said rotary member having a locking groove in its face which has an open entrance end coinciding with the entrance end of said housing groove in a first position, spring means biasing said rotary locking member toward said first position and stop means preventing rotation of said locking member past said first position by said spring means, said locking groove being L-shaped with a first leg portion extending from said open entrance forming an acute angle with the line of generation of the member and having a second leg portion forming an acute angle with the adjacent end portion of the rotary member, whereby in closing said door the bolt rides along said first leg portion rotating said rotary member against said spring means and then is caught behind said second leg portion.

2. A door latch keeper positioned in a jamb adjacent the closing edge portion of a door, comprising: a lock housing positioned in said jamb having a bolt-receiving groove in its door abutting face having an open entrance end at the edge of said jamb which the door approaches in closing; a substantially cylindrical rotary locking member journaled in said housing to rotate about a horizontal axis which is parallel to the face of the jamb, said rotary member having a locking groove in its face which has an open entrance end coinciding with the entrance end of said housing groove in a first position, spring means biasing said rotary locking member toward said first position and stop means preventing rotation of said locking member past said first position by said spring means, said locking groove being L-shaped with a first leg portion extending from said open entrance forming an acute angle with the line of generation of the rotary member and having a second leg portion forming an acute angle with the adjacent end portion of the rotary member, whereby in closing said door a bolt in the door may ride along said first leg portion rotating said rotary member against said spring means and then be caught behind said second leg portion.

3. A door latch keeper positioned in a jamb adjacent the closing edge portion of a door, comprising: a rotary locking member journaled in said jamb to rotate about a horizontal axis which is parallel to the face of the jamb, said rotary member having an L-shaped locking groove in its face forming first and second leg groove portions and spring means biasing said rotary member toward a first position, said first and second leg portions of said L-shaped groove each forming an acute angle with the horizontal so that in closing the door a bolt on the door may enter said first leg portion in said first position and may ride along said first leg portion rotating said rotary member against said spring means and then be caught behind said second leg portion.

4. A door latch keeper positioned in a jamb adjacent the closing edge portion of a door, comprising: a rotary locking member journaled in said jamb to rotate about

an axis extending laterally of said jamb, said rotary member having an L-shaped locking recess in its face forming first and second leg recess portions and means biasing said rotary member toward a first position, said first leg portion of said L-shaped recess forming an acute angle with the longitudinal axis of the jamb so that in closing a bolt on the door may enter said first leg portion in said first position and may ride along said first leg portion rotating said rotary member against said means and then be caught behind said second leg portion of the L-shaped recess.

5. A door latch keeper positioned in one of the two abutting members consisting of the closing edge portion of a door member and the abutting adjacent jamb, comprising: a rotary locking member journaled in a first of said abutting members to rotate about its axis, said rotary member having an L-shaped locking recess in its face forming first and second leg recess portions and spring means biasing said rotary member toward a first position, said rotary member and said leg portions of said L-shaped recess being positioned so that in closing said door a bolt on the second of said abutting members may ride along said first leg portion rotating said rotary member against said spring means and then be caught behind said second leg portion.

6. A door latch keeper positioned in a jamb adjacent

the closing in edge portion of a door, comprising: a locking member positioned in said jamb, said locking member having an L-shaped locking groove in its face forming first and second leg groove portions and the portion of said locking member having said groove being movable substantially vertically and spring means biasing said locking member toward a first position, said first and second leg portions of said L-shaped groove each forming an acute angle with the horizontal so that in closing a bolt on said door may enter said first leg portion in said first position and may ride therealong moving said locking member against the force of said spring means and then be caught behind said second leg portion.

References Cited in the file of this patent

UNITED STATES PATENTS

611,790	Miltier	Oct. 4, 1898
1,070,580	Breithaupt	Aug. 19, 1913
1,459,701	Willis	June 19, 1923
1,558,980	Halinka	Oct. 27, 1925
1,572,293	Judge	Feb. 9, 1926
1,991,822	Snipes	Feb. 19, 1935
2,113,747	Roedding et al.	Apr. 12, 1938
2,616,739	Allen	Nov. 4, 1952
2,647,781	Craig	Aug. 4, 1953