

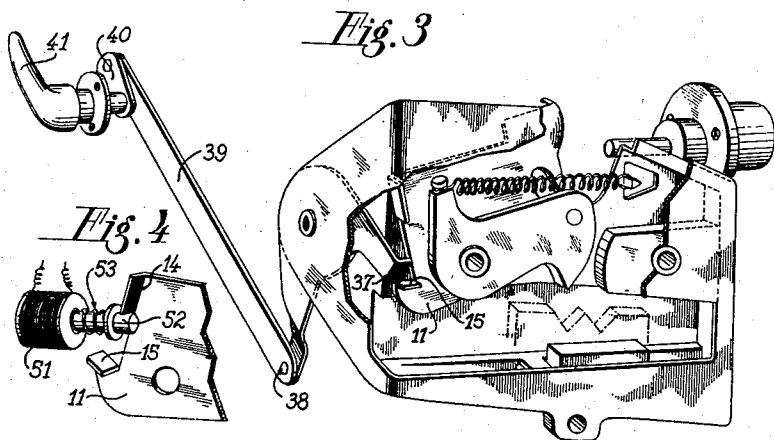
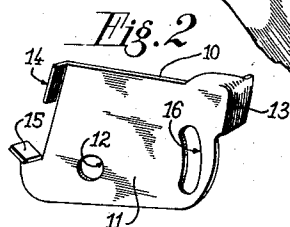
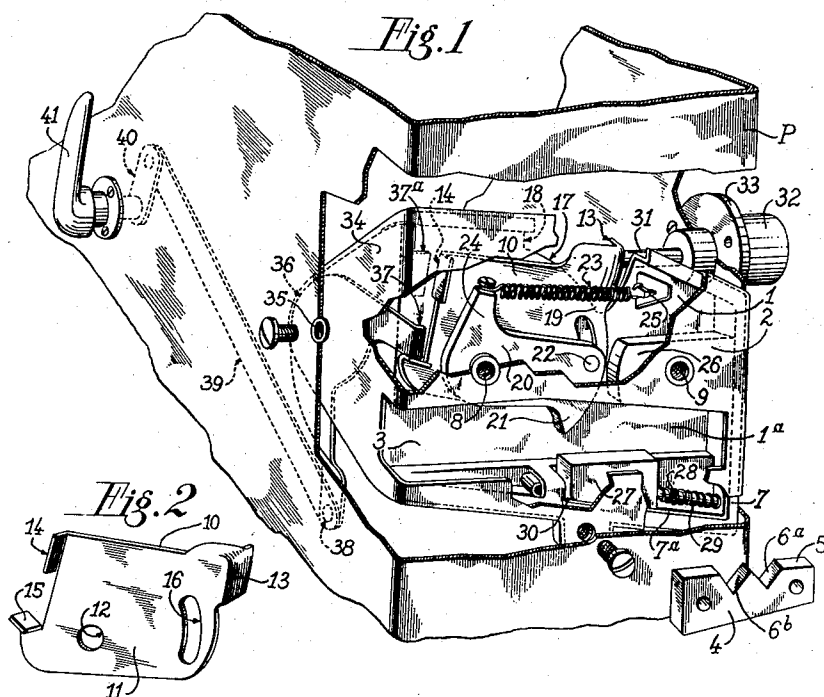
Aug. 27, 1957

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2,804,331

LATCH FOR VEHICLE DOORS

Filed Nov. 23, 1954



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1

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LATCH FOR VEHICLE DOORS

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Application November 23, 1954, Serial No. 470,721

Claims priority, application France November 25, 1953

5 Claims. (Cl. 292—221)

The present invention has for object to provide a latch which is particularly suitable for closing doors of vehicles and in particular doors of automobiles.

The latch of the invention has the following advantages:

The opening of the door may be controlled by means of a push button operated from outside the vehicle, this push button may be locked by a key which may be introduced from outside the vehicle;

The opening and locking of the door may be controlled from inside the vehicle by means of a simple device; in particular, the locking device may be remote-controlled if desired;

It comprises very few parts, is of simple construction, cheap, sure in operation and easy to mount.

This latch comprises in combination two side plates constituting a housing between which are rotatably mounted on a common spindle or pin a driving member comprising a plate provided with an extension which protrudes from the latch and which may be actuated rotatably by a rod rigid with a push button, and a latch bolt provided with a lug which is situated in an arcuate opening formed in said driving member, the centre of curvature of this opening being the centre of the axis of rotation, an elongated housing being provided in one of the side plates below the latch bolt for receiving in the course of the closing movement of the door a keeper having notches, which is introduced and slides in said housing and is capable of cooperating with the nose of the bolt for obtaining the closed position, said bolt being automatically urged towards the closed position by its own weight and by an elastic device.

According to another feature of the invention, the driving member further comprises two feet and the latch includes a rotatable operating and locking member, this member including a projection of such form that by rotating said member in a given direction said projection bears against the first of said feet so as to operate the opening whereas by rotating said member in the opposite direction said projection is positioned in front of and near the second of said feet and thereby constitutes an abutment or stop which prevents the rotational motion of said driving member in the direction for opening the door.

Further advantages and features of the invention will be apparent from the ensuing description with reference to the accompanying drawings in which:

Fig. 1 is a perspective view with parts cut away, of a latch embodying the invention, this latch being in a first position;

Fig. 2 is a view of one element of the latch;

Fig. 3 is a perspective view with a part cut away of the latch in a second position;

Fig. 4 is a diagrammatic fragmentary view of a modification of the invention.

According to the illustrated embodiment, the latch comprises a side plate 1 which serves as a mounting plate for the various members described hereinafter, and a side

2

plate 2 which forms a cover and fits over the plate 1, the assemblage of these plates forming a housing.

The cover or side plate 2 is provided with an elongated opening 3 to allow the passage of a keeper 4 which is secured to the door pillar and comprises, as known per se, a metal block having an inclined upper face 5 provided with two notches 6^a, 6^b which are adapted to cooperate with the latch bolt. A space between the plate 1 and the cover 2 is obtained by means of an edge or flange 7 which is formed up at a right angle over a portion of the periphery of the plate 1 and constitutes a frame against which the cover 2 bears, and furthermore, by means of bosses 8 and 9 inserted in the plate 1 which form spacer members, spindles for fixing or rotatably mounting certain elements of the latch and fixing nuts for fixing the latch to the jam edge of the door P, the bore of these spacer members being tapped for receiving screws extending through the wall of the door.

Rotatably mounted on the plate 1, is a driving member 10 which is shown in Fig. 2. This member is, for example, of pressed steel and has a flat plate portion 11 provided with an aperture 12, which permits its assembly on the boss 8. This flat portion is capable of rotating about the latter and is slidable on the surface of the plate 1. This member 10 comprises furthermore, an oblique portion or ear 13 and two feet 14 and 15 cut out of the plate and formed up at a right angle; the function of these two feet will be explained hereinafter. The plate 11 is provided with an arcuate aperture or opening 16, the centre of curvature of which coincides with the centre of the aperture 12. When this member 10 is mounted on the boss 8 and is applied against the plate 1, the ear 13 protrudes from the latch through a notch 17 formed in the plate 1, this notch being of such shape that it permits the member 10 to pivot through a given angle, this angle being determined by the two ends, 13 and 19, of this notch. The ear 13 abuts these ends at each end of its travel. Rotatably mounted on the same boss and on the driving member 10, is a latch bolt 20 including a nose 21 of suitable shape for cooperating with each of the notches 6^a and 6^b of the keeper 4 in succession. This latch bolt is capable of rotating with respect to the driving member 10 but this rotary movement is limited by a lug or pin 22 secured to this latch bolt and extending into the opening 16. This latch bolt is urged in a clockwise direction (Fig. 1) by a spring 23 which is fixed to a foot 24 and to a tab 25 formed in the plate 1.

The body of the latch bolt is disposed in a generally horizontal direction, the nose being, even when it has been shifted down to the door-closing position, at a level fairly near that of the centre of boss 8. Below the latch bolt, in line with the opening 3, the plate 1 comprises an elongated recess 1^a which is adapted to serve as a slide-way for the keeper when closing the door and as a housing for the keeper when the door is closed.

Fixed to the second boss 9 is a guide block 26 in front of which is slidable a movable guide block 27 through which extends a guide rod 28. This movable block is urged to the left (as seen in Fig. 1) by a coil spring 29 encompassing the rod 28. The blocks 26 and 27 may be of metal or, preferably, of plastic material, for example nylon. The face 30 of the block 27 bears against the lower edge or flange 7^a of the frame of the latch, this edge being inclined with respect to the recessed portion of the plate 1. Thus when the block 27 is urged to the right it moves away from the fixed block 26, but as it is urged to the left by the spring 28 it approaches the fixed block and is therefore capable of exerting a pressure in the direction perpendicular to its travel. The keeper, introduced between the blocks 26 and 27, is therefore

clamped therebetween and the door is thereby prevented from vibrating.

The latch bolt may be rotated in a counterclockwise direction by means of control device comprising a rod 31 rigid with a push button constituted by a cylinder 32 slidable in a barrel 33 secured to the door or preferably to a fixed handle on the door (not shown).

The end of the push rod bears against the ear 13 of the driving member 10, thus when the push button 32 is depressed it causes this member to pivot. Owing to the inclination of the ear 13, the end of the rod 31 is capable of sliding over the formed up portion of the ear and travelling with it in its rotary motion until the member 10 enters into contact with the abutment 18. The push button may be locked by means of a key device which is housed in the cylinder 32 and prevents the sliding motion of this cylinder. This well-known device does not form part of the present invention and it is therefore unnecessary to describe it in detail.

The plate 1 comprises a lateral portion 34 formed up at a right angle. Pivotably mounted on a boss 35, similar to the bosses 8 and 9, is an operating and locking member 36 including a foot 37 formed up at a right angle and disposed in front of the edge of the driving member 10 situated between the feet 14 and 15. This operating member 36 may be controlled by means of any device, for example by a link arrangement pivoted to an arm 38 formed on the member 36. The latter may, furthermore, comprise several arms similar to the arm 38 so as to provide for the control of this member in various ways and thus permit the utilization of the same latch for different purposes. A control device is shown by way of example. It comprises a link 39 and a crank 40 pivoted to the latter, this crank being controlled by means of a handle 41 mounted inside the vehicle.

The operation of this latch is clear from the foregoing description. Normally, the latch bolt 20 is urged in the clockwise direction by its own weight, but is assisted in this movement by the spring 23, which merely constitutes a useful but not indispensable additional safety member. The latch bolt is stopped in its extreme lowermost position by the lug 22 which enters into contact with the lower end of the arcuate opening 16. When, upon closing the door, the keeper 4 enters the housing 1^a and slides therein, it upwardly pivots the latch bolt and the latter falls into the first notch 6^a, the door assuming a first closed position. Thereafter, the keeper continuing in its movement, the latch bolt falls into the second notch 6^b, resulting in the second closed position, or safety position, of the door, the end of the keeper being gripped between the fixed block 26 and the block 27, which was yieldably urged away from the block 26 when the keeper passed between these blocks.

The door is thus latched and held steady. The general position of the latch bolt permits obtaining a particularly efficient latching position since the force tending to open the door has for effect to cause the keeper to exert a force on the latch bolt, this force being applied in the longitudinal direction of the latch bolt and substantially toward the axis of rotation of the latter. This member is therefore in the best position for resisting a considerable force relative to its dimensions.

To open the door from outside the vehicle, the push button 32 is depressed so as to bring the rod 31 into contact with the ear 13 and thereby pivot the driving member 10 in the counter-clockwise direction. This member drives the lug 22 and in consequence causes the latch bolt 20 to pivot in the same direction in opposition to the action of the spring 23. The keeper 4 is thus released and is free to withdraw from the latch when the door is opened. This rotary movement of the member 10 is limited by the abutment 18.

If it is desired to open the door from inside the vehicle, it is merely necessary to turn the handle 41 in the counter-clockwise direction to the position shown in Fig.

3. The link 39 is pulled, the operating member 36 rotates in the clockwise direction, the foot 37 enters into contact with the foot 15 of the driving member 10 and pivots the latter in the counter clockwise direction in opposition to the action of the spring 23, the push button 32 being then inactive.

If it is desired to lock the latch, it is merely necessary to turn the handle 41 in the clockwise direction so as to exert a pressure on the link 39, which causes the member 36 to pivot in the counter clockwise direction and moves the foot 37 to position 37^a, shown in dotted line in Fig. 1. In this position, if it is attempted to release the latch by depressing the push button 32, the foot 14 of the member 10 abuts the foot 37^a and the member 10 is prevented from pivoting.

In this way there is obtained an extremely simple latch which has few elements, is easy to make and is cheap. This latch may be easily controlled from inside and from outside the vehicle and, furthermore, the locking of the latch is simple to effect by merely changing the position of the member 36 by pivoting the arm 38. This may be obtained not only by the link arrangement illustrated by way of example, but also by other mechanical means, in particular linkages of various types, cable controls, etc. These various operating means may of course operate the door from a distance. This control is not necessarily mechanical; it is also within the scope of the invention to include a remote control or other control including pneumatic, hydraulic or electric means.

The constructional details of these controls are obvious to one skilled in the art. The actuating devices may comprise either a piston actuated by a fluid under pressure or by suction from the intake pipe of the motor, or an electromagnet connected to the electric circuit of the vehicle.

By way of example there has been shown in Fig. 4 a view of a latch-locking control including an electromagnet which has a coil 51 and is capable of being controlled from a distance. A plunger 52 is drawn into the electromagnet when the latter is excited and emerges from the electromagnet, when the latter is not excited, under the action of a return spring 53 and places itself in front of the foot 14 of the member 10 and thereby prevents the latter from pivoting.

It is clear that it is also easy to lock the latch in such manner that the plunger is normally in the position for unlocking the latch and enters into a locking position when it is attracted by the electromagnet. It is also within the capabilities of one skilled in the art to construct a control in which a short period of excitation of the electromagnet momentarily attracts the plunger and then allows it to return to its unlocking position so as to bring the latch-locking element alternately to its latch-locking and latch-unlocking position, whereby the control circuit is only closed and carrying current during the brief periods of actually shifting the plunger.

Although a specific embodiment of the invention has been described hereinbefore, it is to be understood that many changes and modifications may be made therein without departing from the spirit of the invention or the scope of the appended claims.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. A latch for a door adapted to be swung to and from a fixed door pillar, a transverse end face of the door being in opposed relation to the door pillar in the closed position of the door, this latch comprising: a keeper adapted to be fixed to the door pillar and having a notched face, a housing adapted to be fixed to said end face of the door and comprising a mounting plate, the mounting plate being disposed transversely of the door, a spindle rigid with and substantially perpendicular to the mounting plate, a driving member pivotably mounted on said spindle and extending substantially parallel to the mounting plate, an extension formed on the driving member, an

5

6

arcuate aperture formed in the driving member, the centre of curvature of this arcuate aperture coinciding with the axis of said spindle, an elongated substantially horizontally extending latch bolt pivotably mounted at one end thereof on said spindle on the same side of the mounting plate as the driving member, a nose provided on the end of the latch bolt remote from said pivotal mounting thereof and adapted to engage and latch the notched face of said keeper when the door is moved to its closed position, an aperture formed in the housing to allow said nose to engage said keeper, means for urging the latch bolt about the axis of said spindle to a position in which its nose is capable of engaging the notched face of the keeper when the door is closed, a lug rigid with the latch bolt disposed in said arcuate aperture and freely movable between the two ends of the latter, the position and angular extent of the arcuate aperture relative to the axis of said spindle being such that in a first position of the driving member the lug is at one end of the arcuate aperture and the latch bolt is positively held by this end in a position in which the nose cannot engage the notched face of the keeper and in a second position of the driving member the lug of the latch bolt is applied against the same end of the arcuate aperture by said means for urging the latch bolt about the axis of the spindle and the nose is in a position to engage the notched face of the keeper, the lug being however free to move toward the other end of said arcuate aperture and thereby allow said nose to move to a position in which it is incapable of engagement with the keeper, a control device combined with the housing and comprising a member which is co-operable with said extension and is movable between a door opening position and a door closing position, this member when it is moved to said door opening position co-operating with the extension and urging the driving member to said first position thereof and when it is moved to said door closing position permitting the driving member to move to said second position thereof, a first foot and a second foot formed on said driving member in spaced relation to one another, a second spindle fixed in position relative to said mounting plate, an operating and locking member pivotably mounted on said second spindle, a projection formed on the operating and locking member and disposed between said two feet, the projection co-operating with said feet in such manner that when the operating and locking member is pivoted in one direction the projection is capable of engaging the first foot and thus pivoting the driving plate to said first position thereof and when the operating and locking member is pivoted in the opposite direction the projection is capable of engaging the second foot and preventing the latter from moving thus preventing the driving member from pivoting to said second position thereof, and control means for pivoting and holding the operating and locking member in position.

2. Latch as claimed in claim 1, wherein said means for pivoting and holding the operating and locking member in position comprise an operating handle mounted on the vehicle door and a system of links connecting the handle to the operating and locking member.

3. A latch for a door adapted to be swung to and from a fixed door pillar, a transverse end face of the door being in opposed relation to the door pillar in the closed position of the door, this latch comprising: a keeper adapted to be fixed to the door pillar and having a notched face, a housing adapted to be fixed to said end face of the door and comprising a mounting plate, the mounting plate being disposed transversely of the door, a spindle rigid with and substantially perpendicular to the mounting plate, a driving member pivotably mounted on said spindle and extending substantially parallel to the mounting plate, an extension formed on the driving member, an arcuate aperture formed in the driving member, the centre of curvature of this arcuate aperture coinciding with the axis of said spindle, an elongated substantially horizontally extending latch bolt pivotably mounted at one end thereof

on said spindle on the same side of the mounting plate as the driving member, a nose provided on the end of the latch bolt remote from said pivotal mounting thereof and adapted to engage and latch the notched face of said keeper when the door is moved to its closed position, an aperture formed in the housing to allow said nose to engage said keeper, means for urging the latch bolt about the axis of said spindle to a position in which its nose is capable of engaging the notched face of the keeper when the door is closed, a lug rigid with the latch bolt disposed in said arcuate aperture and freely movable between the two ends of the latter, the position and angular extent of the arcuate aperture relative to the axis of said spindle being such that in a first position of the driving member the lug is at one end of the arcuate aperture and the latch bolt is positively held by this end in a position in which the nose cannot engage the notched face of the keeper and in a second position of the driving member the lug of the latch bolt is applied against the same end of the arcuate aperture by said means for urging the latch bolt about the axis of the spindle and the nose is in a position to engage the notched face of the keeper, the lug being however free to move toward the other end of said arcuate aperture and thereby allow said nose to move to a position in which it is incapable of engagement with the keeper, a control device combined with the housing and comprising a member which is co-operable with said extension and is movable between a door opening position and a door closing position, this member when it is moved to said door opening position co-operating with the extension and urging the driving member to said first position thereof and when it is moved to said door closing position permitting the driving plate to move to said second position thereof, a first foot and a second foot formed on said driving member in spaced relation to one another, a second spindle fixed in position relative to said mounting plate, an operating member pivotably mounted on said second spindle, a projection formed on the operating member and disposed between said two feet, the projection co-operating with the first foot in such manner that when the operating member is pivoted in one direction the projection is capable of engaging the first foot and thus pivoting the driving member to said first position thereof, a locking member movable into co-operation with said second foot in such manner as to stop this foot from moving in the direction corresponding to the movement of the driving member toward said first position thereof and thus prevent the latch from being opened, means for controlling the pivoting and position of the operating member and means for controlling the movement of said locking member.

4. Latch as claimed in claim 3, wherein said means for controlling the pivoting and position of the operating member comprise an operating handle mounted on the door and a system of links connecting the handle to the operating member.

5. Latch as claimed in claim 3, wherein said means for controlling the movement of the locking member comprise an electric coil and a core connected to the locking member.

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