Oct. 14, 1952 C. O. GOSERUD 2,613,971

DOOR LATCH

Filed May 23, 1946

FIG. 1

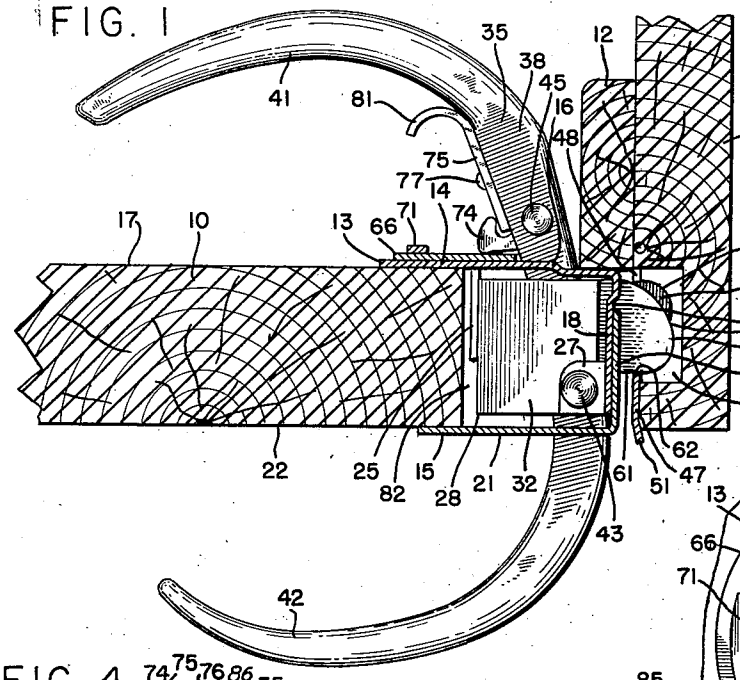


FIG. 7

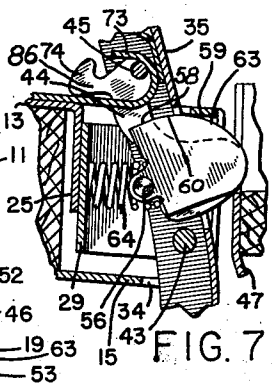


FIG. 5

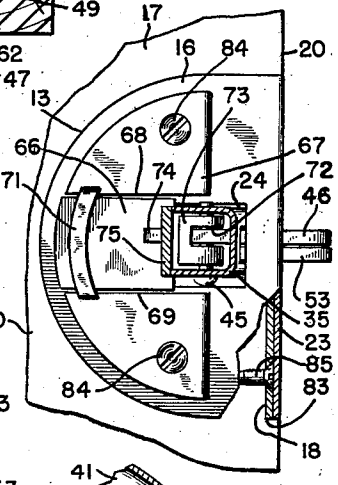


FIG. 4

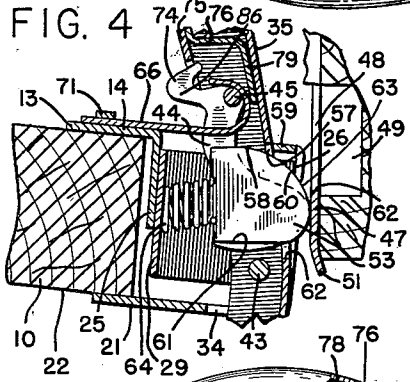


FIG. 6

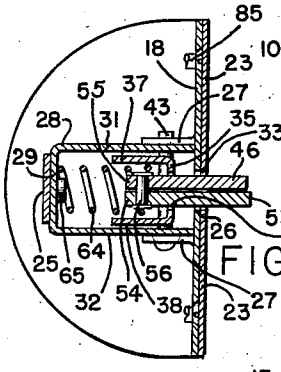


FIG. 2

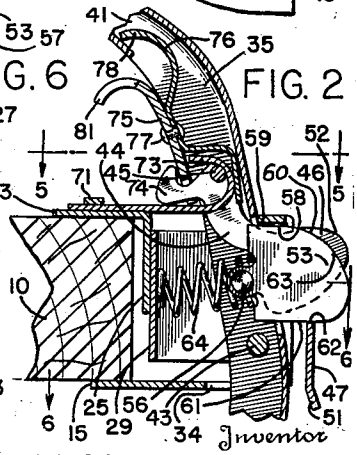
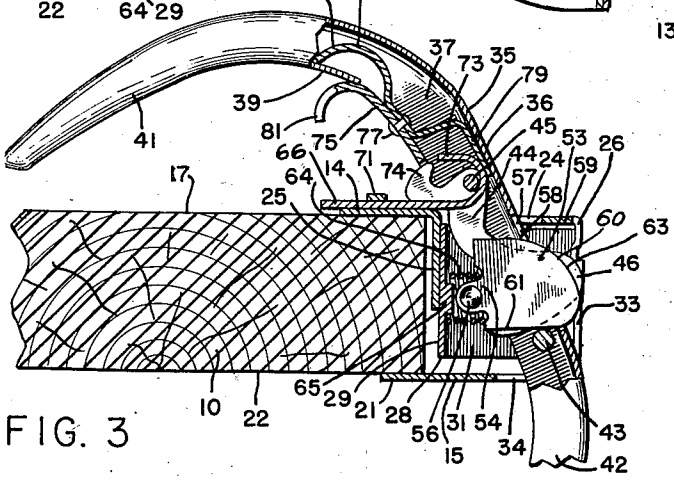


FIG. 3



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Patented Oct. 14, 1952

2,613,971

UNITED STATES PATENT OFFICE

2,613,971

DOOR LATCH

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Application May 23, 1946, Serial No. 671,848

11 Claims. (Cl. 292—226)

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My invention relates to door latches and particularly to latches for use in conjunction with screen doors and storm doors.

An object of the invention resides in providing a latch which is easy to operate.

Another object of the invention resides in providing a latch which will hold the door tightly closed.

Another object of the invention resides in providing a latch in which pressure on the latch lug will not release the latch.

An object of the invention resides in providing a latch in which the door may be slammed shut and the latch lug positively brought into latching position.

A still further object of the invention resides in providing a latch having a housing and a lever pivoted thereto and in pivoting to said lever an arm carrying a striker lug for engagement with the striker plate of the invention.

Another object of the invention resides in providing a latch lug pivoted to the arm and that can be moved into engagement with the striker plate.

A still further object of the invention resides in the construction for mounting the spring which urges the latch lug into engagement with the striker plate.

A feature of the invention resides in constructing said arm with a catch and in providing a locking member for engaging the catch to restrain movement of the latch lug with respect to the lever.

An object of the invention resides in forming in the housing a slot through which said lever extends and in which the same is movable and in providing a follower connected to the lever and arranged to close said slot.

Other objects of the invention reside in the novel combination and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

In the drawings:

Fig. 1 is a plan sectional view of a portion of a screen door and casing illustrating an embodiment of my invention applied thereto.

Fig. 2 is a view similar to Fig. 1 with portions of the lever and housing cut away and showing the operating mechanism of the invention.

Fig. 3 is a view similar to Figs. 1 and 2 showing the parts in altered position.

Fig. 4 is a view similar to Fig. 2 showing the parts in still different position.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 2.

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Fig. 6 is a sectional view taken on line 6—6 of Fig. 2.

Fig. 7 is a view similar to Fig. 3 showing the parts in still different position.

For the purpose of illustrating my invention, I have shown in the drawings, a portion of a door 10 which is movable toward and from a casing 11. This casing has a stop 12 with which the door 10 engages when in closed position. The door is hinged in the customary manner at the edge of the same opposite the stop 12.

My improved latch comprises a housing 13 which is constructed in two sections 14 and 15. The section 14 has a wall 16 which overlies the inner surface 17 of the door 10. The said section also has a wall 18 which overlies the edge 20 of the door which faces the casing 11. This wall is formed with an offset 19. The section 15 of the housing 13 has a wall 21 which overlies the outer surface 22 of the door 10. Said section also has a wall 23 which overlies the wall 18 of section 14 and fits into the offset 19. This permits of forming a substantially smooth surface at the edge 20 of the door and permits of attaching the housing to doors of varying thickness. In the wall 16 of section 14 of housing 13 is formed a slot 24. This slot is constructed by severing a portion of the metal of the wall and bending said portion inwardly at right angles as best shown in Fig. 3. This portion forms a back to the housing which is indicated at 25 in said figure. The section 14 has an opening 26 formed in the wall 18 of the same and extending throughout the width of said wall. The metal removed from the wall 18 in the formation of this opening is turned back into the interior of the housing to form two ears 27 shown in Figs. 1 and 6. The wall 23 of the section 15 is formed with an opening 33 which registers with the opening 26. In conjunction with the housing 13, a wall structure 28 is employed which consists of a back 29 and two side walls 31 and 32. This wall structure is of such dimension that the same fits snugly between the back 25 and the wall 18 and so that the two side walls 31 and 32 fit snugly between the ears 27 as shown in Fig. 6. The wall 21 of section 15 is formed with an opening 34 which forms a continuation of the openings 33 and 26 in the walls 18 and 23.

The door 10 is formed with a cavity 82 which receives the housing 13. The walls 16 and 21 of the housing overly the surfaces 17 and 22 of the door 10 upon the exterior thereof while the walls 18 and 23 are received in a recess 83 formed in the edge 20 of the door. The section 14 of the

housing 13 is attached to the door by means of screws 84 and 85 while the section 15 is similarly attached by means of screws not shown.

Operating in the slot 24 and in the opening 34 in housing 13 is a lever 35. This lever is constructed from sheet metal having a back 36, sides 37 and 38 and flanges 39 issuing from the said sides 37 and 38 and forming a composite wall opposite the back 36. The lever 35 is so constructed that handles 41 and 42 are formed on the same and at the ends thereof and by means of which the said lever may be manipulated. Handle 42 is situated exteriorly of the door and handle 41 is situated interiorly of the door. The lever 35 is pivoted to the housing 13 by means of a pintle 43 which extends jointly through the walls 37 and 38 of said lever and through the ears 27 and the side walls 31 and 32 of the wall structure 28. This lever is so situated that the same clears the stop 12 and so that said lever may swing from the position shown in Fig. 1 to that shown in Fig. 3.

Within the interior of the lever 35 is situated an arm 44. This arm is pivoted to said lever by means of a pintle 45 which extends through the walls 37 and 38 of said lever and said arm and which is located interiorly of the door and outwardly of the housing 13. The arm 44 has a striker lug 46 formed on the same which is adapted to engage a striker plate 47 attached to the casing 11 of the door. This striker plate is secured to the casing in the usual manner and has an opening 48 in the same and through which the lug 46 may extend. The casing 11 is recessed as indicated at 49 to receive the lug 46. The edge 51 of said striker plate is turned back so as to form a cam adapted to engage a curved edge 52 on the striker lug 46 whereby the said striker lug may be forced inwardly into the housing 13 when the said lug engages the striker plate.

Pivoted to the arm 44 is a latch lug 53. This latch lug has an ear 54 projecting outwardly therefrom which overlies a similar ear 55 on the arm 44 and immediately back of the striker lug 46. A pintle 56 passes jointly through said ears and pivots the latch lug 53 for swinging movement relative to the striker lug 46. Both the lugs 46 and 53 operate in a slot 57 formed in the back 36 of the lever 35 and are adapted to project outwardly through the slots 26 and 33 in housing 13. The latch lug 53 has a surface 60 which is adapted to engage the inner surface 59 of the wall 14. When the said surface is in engagement with the surface 59, the lug 53 is restrained from swinging movement relative to the housing 13 and lever 35. The surface 60 consists of a flat portion 58 and a curved portion 63 which merges into the flat portion 58. The said latch lug also has a surface 61 which is adapted to engage the edge 62 of the striker plate 47 when the door is closed. The portion 63 of surface 60 clears the structure of the striker plate 47 when the latch lug is being moved into and out of the opening 48 in the striker plate.

The lever 35 is urged to its position shown in Fig. 1 by means of a compression coil spring 64 which encircles the ears 54 and 55 of the lugs 46 and 53 and is seated against the arm 44 and the lug 53. The other end of this spring is seated against the back 29 of wall structure 28 and encircles a boss 65 formed on said back.

For the purpose of closing the slot 24 in the wall 16 of housing 13, a cover plate 66 is employed which overlies said slot. This cover plate is guided for movement by means of a guide 67 best shown in Fig. 5. Said guide is formed by striking up a portion of the wall 16 on each side of the slot 24. This construction forms two edges 68 and 69 along which the plate 66 rides. Said guide is further formed to provide a strap 71 which overlies the cover plate 66 at its outer end and holds the same in position. The cover plate 66 has a slot 72 in its innermost end and through which the arm 44 projects. The said cover plate is constructed with a hook 73 which hooks about the pintle 45 and causes the said cover plate to move with the lever 35 when the lever 35 is moved to the right as viewed in Figs. 4 and 7. When the lever 35 is moved toward the left, said hook engages a part movable with the lever 35 namely the finger 79 of locking member 75 which will be presently described in detail thus causing corresponding movement of the cover plate. The said cover plate thus forms a follower which follows with the said lever and closes the slot 24 as the lever moves toward its position shown in Fig. 1.

For the purpose of locking the lever 35 from movement, the arm 44 is constructed with a catch 74. This catch has an operating member 86 on the end of the same which engages the cover plate 66. The catch 74 is adapted to be engaged by means of a locking member 75. This locking member has a spring 76 riveted to the same by means of a rivet 77. The spring 76 is formed with a finger 78 which rides upon the inner surface of the flanges 39 of lever 35 and another finger 79 which is disposed back of the hook 73. This latter finger is disposed adjacent the wall 36 of the lever 35. By means of this construction, the locking member 75 is guided for sliding movement along the lever 35. The locking member 75 has a fingerpiece 81 formed on the same and by means of which said member may be manipulated. When the member 75 is urged in back of the catch 74, the lever 35 is restrained from movement and the door is locked.

The operation of the invention is as follows: When the parts are in normal position, whether the door is open or closed, the lever 35 and the two lugs 46 and 53 are in the positions shown in Figs. 1 and 2. If the door be open and the same is moved toward closing position, the edge 52 of the striker lug 46 engages the cam 51 of striker plate 47 and forces the arm 44 inwardly. This moves the latch lug 53 into the position shown in Fig. 4 without swinging of the lever 35, movement of the two lugs 46 and 53 being resisted by the spring 64. Continued movement of the door toward closing position will bring the lugs 46 and 53 opposite the opening 48 in striker plate 47 and the spring 64 will cause the said lugs to enter the opening 48 and assume the positions shown in Fig. 2. It will be noted that the portion 58 of surface 60 on latch lug 53 lies opposite the surface 59 of wall 16 of housing 13 and that the surface 61 of said latch lug lies adjacent the edge 62 of the striker plate 47. Movement of the door outwardly is restrained by engagement of the surface 61 with the edge 62. This movement is resisted by the portion 58 of surface 60 engaging the surface 59. In this position, the latch lug 53 is held immovable and pressure on the same is ineffective to shift its position and ineffective to cause opening of the door. When it becomes desirable to open the door manually, lever 35 is swung by means of either of the handles 41 or 42 toward the position shown in Fig. 3. During such movement the

pintle 45 approaches the plate 66 and operating member 82 being in engagement therewith and so held by spring 64 swings the arm 44 relative to lever 35. This moves the arm 44 inwardly into housing 13 and the latch lug 53 which is pivoted thereto is withdrawn from engagement with the striker plate 47. As the latch lug 53 moves, the flat portion 58 and then the curved portion 63 follows along the surface 59 of the housing 13. The location of the parts when the lugs 46 and 53 are about to clear the striker plate 47 is shown in Fig. 7. The relation of the parts when the said lugs are fully retracted is shown in Fig. 3. Since the flat portion 58 of surface 60 of latch lug 53 is relatively short, a small movement of the arm 44 causes the curved portion 63 of surface 60 of said latch lug to follow along the surface 59 of housing 13. This causes the surface 61 of said latch lug to rapidly recede from the edge 62 of striker plate 47. Thus, the door 10 commences to swing outwardly at the same time that the latch lug is being disengaged thereby causing the latch lug to roll on the edge 62 instead of slide along the same. The fact that the portion 61 of surface 60 of the lug 53 recedes from edge 62 of the stroker plate permits of latching the door when the same is partly open as would be the case if ice or other foreign matter became disposed between the door and casing. In such position the parts would be disposed as shown in Fig. 7 and the curved portion 63 of surface 60 would restrain swinging of the lug 53 without movement of lever 35. The arcuate movement of the latch lug 53 caused by swinging about the pintle 43 is compensated for by pivoting the same to the arm 44. Thus the said latch lug can move inwardly into the housing in a substantially parallel direction with reference to the surface 59 when the latch lug is being disengaged from the striker plate 47. Upon release of the lever 35, the parts are immediately moved back into the position shown in Fig. 2.

The advantages of my invention are manifest. When the door is latched, the latch lug is held immovable in the direction of travel of the latched portion of the door and pressure upon the latch lug will not alter its position or permit of unintentionally opening the door by applying pressure to said latch lug. By means of the striker lug employed, the latch lug is easily retracted to permit of the same clearing the striker plate and entering into the opening in the striker plate. By the use of the pivoted arm connected to the lever, the door may be moved into closing position without causing swinging of the lever and the handles connected to the same. The opening formed in the housing is maintained closed when the latch is in closing position so as to prevent entry of insects through the latch and into the interior of the building with which the latch is being used. By means of the latching mechanism shown, the arm carrying the latch lug serves a dual purpose and is held from movement by means of a slide whereby positive locking of the parts is secured.

Changes in the specific form of my invention, as herein described, may be made within the scope of what is claimed without departing from the spirit of my invention.

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

1. In a door latch, a housing, a lever pivoted to said housing, an arm pivoted to said lever, a striker plate opposite said housing having a striking surface and a latching surface, a latch lug having a body portion extending outwardly beyond said housing and an ear, said arm having a striking lug fixed relative thereto and formed with a body portion adapted to normally project outwardly beyond said housing, an ear on said arm, pivot means for connecting the ear of said latch lug to the ear on said arm and a compression coil spring encircling said ears at one end and seated against the body portion of said latch lug and said arm and seated at its other end against said housing, said spring serving to urge said lugs outwardly through the opening in said wall of the housing, said latch lug having a latching surface engageable with the latching surface of said striker plate and a second surface formed with a flat portion and a curved portion merging into one another, said housing having a surface adapted to be engaged by said second surface of the latch lug to restrain movement between the latching surfaces of the latch lug and striker plate, said striking lug having a surface engageable with the striking surface of said striker plate and leading said second surface of said latch lug and causing inward movement of said latch lug upon closing of the door.

2. In a door latch, a housing, a lever pivoted to said housing, an arm pivoted to said lever at a locality outwardly from said housing, a latch lug carried by said arm and normally projecting through said housing, resilient means for urging said arm and latch lug outwardly, a striker plate having a latching surface, said latch lug having a latching surface engaging the latching surface of said striker plate and restraining opening of the door, said housing having a surface and said latch lug having a second surface engageable with the surface of said housing to restrain movement between said latch lug and striker plate at the latching surfaces thereof, a catch formed on said arm outwardly of said housing, guide means on said housing engaging said catch and causing swinging of said arm relative to said lever upon swinging of said lever and retraction of said latch lug along the surface of said housing and a slide guided for movement along said lever and having a portion adapted to engage said catch to restrain movement between said arm and lever and to prevent swinging of said lever to lock said latch lug in extended position.

3. In a door latch, a housing having a wall formed with a slot, a lever pivoted to said housing and extending through and movable in said slot, a follower connected to said lever and closing said slot, means for guiding said follower for movement in the same direction as said lever, an arm, pivot means between said arm and lever, a latch lug carried by said arm and normally extending outwardly beyond said housing, said arm extending through said follower, an operating member on the projecting portion of said arm and engaging said follower, said pivot means approaching said follower upon swinging of the lever and causing swinging movement of the arm by means of said operating member and movement of the latch lug into the housing and resilient means for urging the latch lug outwardly.

4. In a door latch, a housing, a lever pivoted to said housing, an arm pivoted to said lever, a striker plate opposite said housing and having a striking surface and a latching surface, a latch lug pivoted to said arm and normally projecting outwardly beyond said housing and in the direction of said striker plate, said lug having a surface adapted to engage the latching surface of said striker plate to restrain relative movement

therebetween, said latch lug having a short flat surface adapted to engage a corresponding surface on said housing to restrain relative movement between said latch lug and housing, said latch lug further having a curved surface merging into said flat surface and adapted to clear the surface on said housing after the flat surface has passed the same, the pivot for said latch lug being disposed intermediate the first named surface of the same and the flat surface and inwardly thereof, means acting between said lever and housing and adapted upon swinging movement of said lever to move said latch lug in the direction of the denoted surface on said housing to free the same from the housing and resilient means for urging said latch lug outwardly.

5. In a door latch, a housing, a lever pivoted to said housing, an arm pivoted to said lever, a striker plate opposite said housing and having a striking surface and a latching surface, a latch lug pivoted to said arm and normally projecting outwardly beyond said housing, said latch lug being movable toward and from the striker plate, said latch lug having a surface adapted to progressively engage said latching surface as the door closes and the latch lug moves toward the striker plate, said housing having a part opposite said surface of said latch, said latch lug further having a restraining surface adapted to follow along said part of said housing as the latch lug moves toward said striker plate and assisting in resisting movement of the latch lug in a direction to restrain opening movement of the door at various settings of said latch lug relative to said striker plate and resilient means for urging said latch lug outwardly and yieldingly holding said latch lug in engagement with the striker plate.

6. In a door latch, a striker plate carried by the door frame having a striking surface and a latching surface, a housing carried by the door, a lever pivoted to said housing for swinging movement in a horizontal plane and extending outwardly through said housing, an arm pivoted to said lever outwardly of said housing for swinging movement relative to said lever and housing in a horizontal plane, said housing having an opening facing the striker plate and being formed adjacent said opening with an abutment surface parallel with and spaced from said latching surface of the striker plate when the door is in closed position, a latch lug pivoted to said arm at a locality inwardly from said opening in the housing and within the housing and intermediate the marginal portions of said housing adjacent said opening, said latch lug being movable in the opening in the housing and toward the striker plate to a position between the latching surface of the striker plate and the abutment surface of the housing when the door is closed, said latch lug having a restraining surface disposed adjacent to and extending generally in the same direction as said abutment surface on the housing and coacting therewith to restrain movement of the latch lug away from the striker plate, said latch lug having a curved surface merging into said restraining surface, a striker lug fixed on said arm and movable in the opening in the housing and toward the striker plate, said lug engaging the striking surface of the striker plate in advance of the latch lug on closing of the door and swinging said arm relative to the lever and retracting the latch lug away from the striker plate and withdrawing the restraining surface away from the abutment surface to accommodate swinging of the latch lug with the curved surface thereof following the abutment surface, said striker lug in its movement clearing the marginal portions of said housing adjacent the opening therein and resilient means for urging said lugs outwardly through the opening in said housing.

7. In a door latch, a housing having a wall formed with a slot, a lever pivoted to said housing and extending through and movable in said slot, a follower connected to said lever and closing said slot, guide means for guiding said follower for movement in the same direction as said lever, an arm, pivot means between said arm and lever and disposed outwardly of said follower, said pivot means approaching said follower upon swinging of the lever in one direction, a latch lug carried by said arm and normally extending outwardly beyond said housing, said arm extending through said follower, an operating member on the projecting portion of said arm and engaging said follower and causing swinging movement of said arm upon swinging movement of said lever, said member being situated closer to the pivot for the arm than said latch lug and causing rapid movement of said latch lug into said housing and resilient means for moving said latch lug outwardly.

8. In a door latch, a housing having a wall, a lever pivoted to said housing and extending through said wall, an arm carried by said lever, pivot means between said lever and arm and disposed exteriorly of said housing, said pivot means approaching said wall of the housing upon swinging of said lever in one direction, a latch lug pivoted to said arm at a locality within said housing and adapted to normally extend outwardly beyond said housing, an operating member formed on said arm and extending outwardly from said arm, means for guiding said operating member for sliding movement in the direction of extent of said wall, said operating member causing movement of the latch lug into the housing and resilient means for moving the latch lug outwardly.

9. In a door latch, a housing, a lever, pivot means between said lever and housing and having a vertical axis, an arm, pivot means between said lever and arm and having a vertical axis, said last named pivot means being disposed in spaced relation with reference to said first named pivot means, a striker plate opposite said housing and having a striking surface and a vertical latching surface in a plane substantially parallel to the plane of the door, a latch lug normally projecting outwardly beyond said housing and in the direction of said striker plate, said latch lug having a latching surface engaging the latching surface of said striker plate and substantially coplanar therewith to restrain relative movement therebetween, pivot means between said latch lug and said arm and having a vertical axis, said last named pivot means lying between said first and second pivot means, said latch lug having a surface formed with a flat portion spaced from and substantially parallel to the latching surface of said latch lug, said housing having a surface engageable by said second surface of said latch lug and restraining relative movement between the latching surface of said latch lug and the latching surface of the striker plate to resist opening of the door, a striker lug fixed on said arm and substantially overlying said latch lug, said striker lug having a surface engageable with the striking surface of the striker plate and serving to swing said arm inwardly into said housing

upon engagement with said striker plate to withdraw said latching lug from engagement with the latching surface of said striker plate, the second named surface of said latch lug having an arcuate portion joining the flat portion and clearing said surface of the housing to accommodate rocking movement of the latch lug on the striker plate and pivotal movement about the pivot between said latch lug and arm, said surface of the striker lug leading the curved portion of the second surface of the latch lug during closing movement of the door to reduce friction between the latch lug and housing, and resilient means reacting against a part fixed relative to said housing and a part movable with said arm and urging said latch lug and striker lug toward said striker plate.

10. In a door latch, a housing, a lever pivoted to said housing and having a portion extending through said housing, said housing having a part adjacent the portion of said lever extending through the housing, an arm pivoted to said lever and extending through said housing and into said housing in proximity to said part, a latch lug pivoted to said arm within said housing and normally projecting through said housing, and an operating member on the outer portion of said arm disposed laterally from the pivot of said arm and adapted to engage said part and operating through engagement therewith as a cam upon swinging of said lever to swing said arm and retract the latch lug.

11. In a door latch, a housing, a lever pivoted to said housing, an arm pivoted to said lever, a striker plate opposite said housing and having a striking surface and a latching surface, a latch lug pivoted to said arm and normally projecting

outwardly beyond said housing and in the direction of said striker plate, said lug having a latching surface adapted to engage the latching surface of said striker plate to restrain relative movement therebetween, said latch lug having a flat surface adapted to engage a corresponding surface on said housing to restrain relative movement between said latch lug and housing, said latch lug further having a curved surface merging into said flat surface and adapted to clear the surface on said housing after the flat surface has passed the same, the pivot for said latch lug being disposed intermediate the latching surface and the flat surface of the same and inwardly thereof, the pivot for said arm approaching said housing upon swinging of said lever, an operating member on said arm engageable with a part on said housing and swinging said arm relative to said lever upon swinging of said lever to move said latch lug in the direction of the denoted surface of said housing to free the same from the housing and resilient means for urging said latch lug outwardly.

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