

Dec. 10, 1940.

W. A. ENDTER

2,224,512

DOOR LATCH

Filed Oct. 17, 1936

4 Sheets-Sheet 1

Fig. 1.

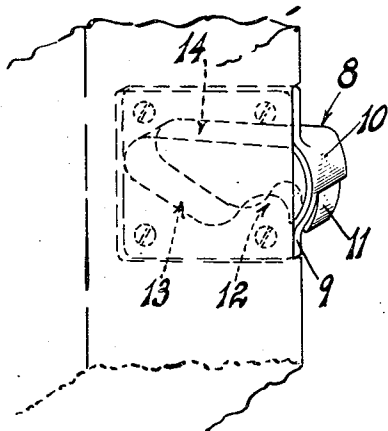


Fig. 2.

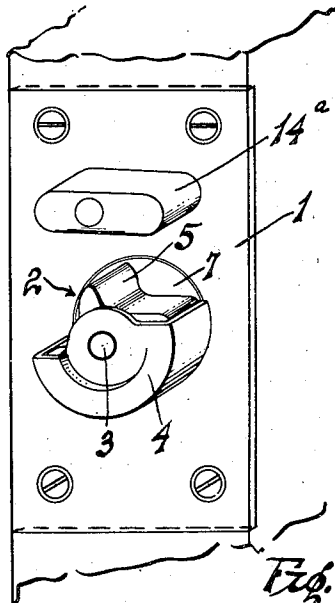


Fig. 3.

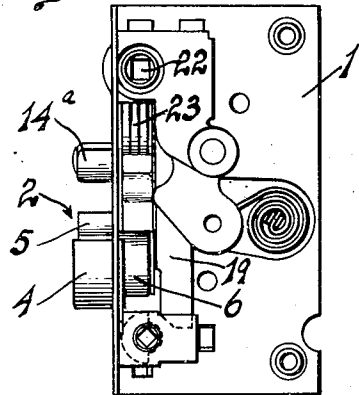


Fig. 5.

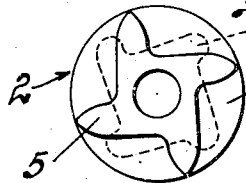


Fig. 6.

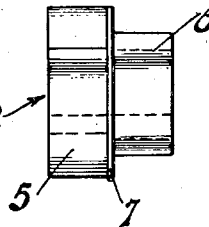


Fig. 4.

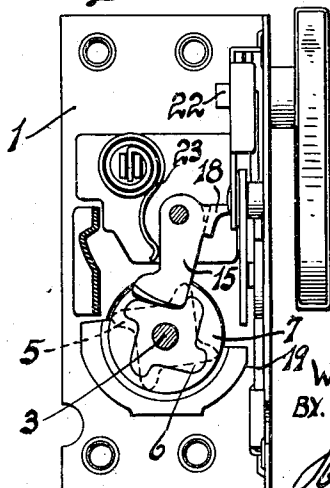
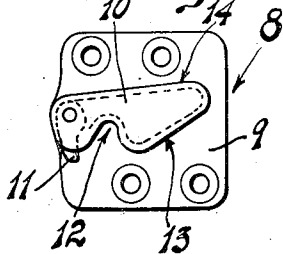


Fig. 7.



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Fig. 8.

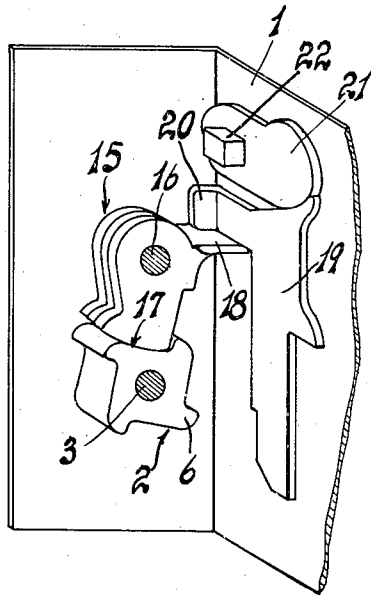


Fig. 9.

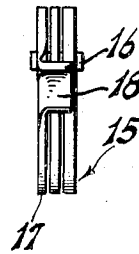


Fig. 10.

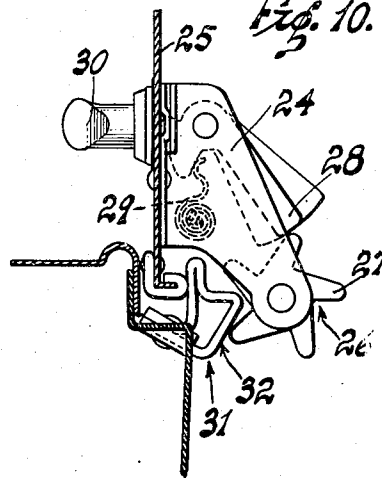


Fig. 12.

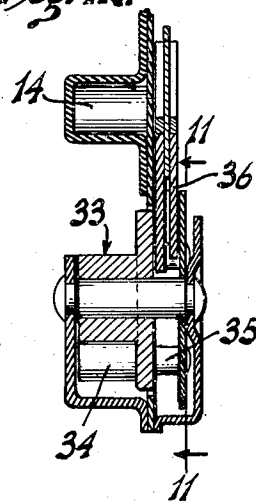
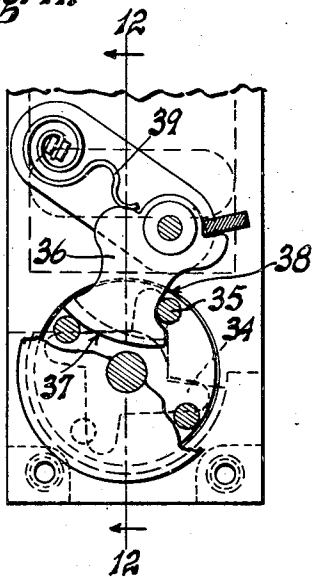


Fig. 11.



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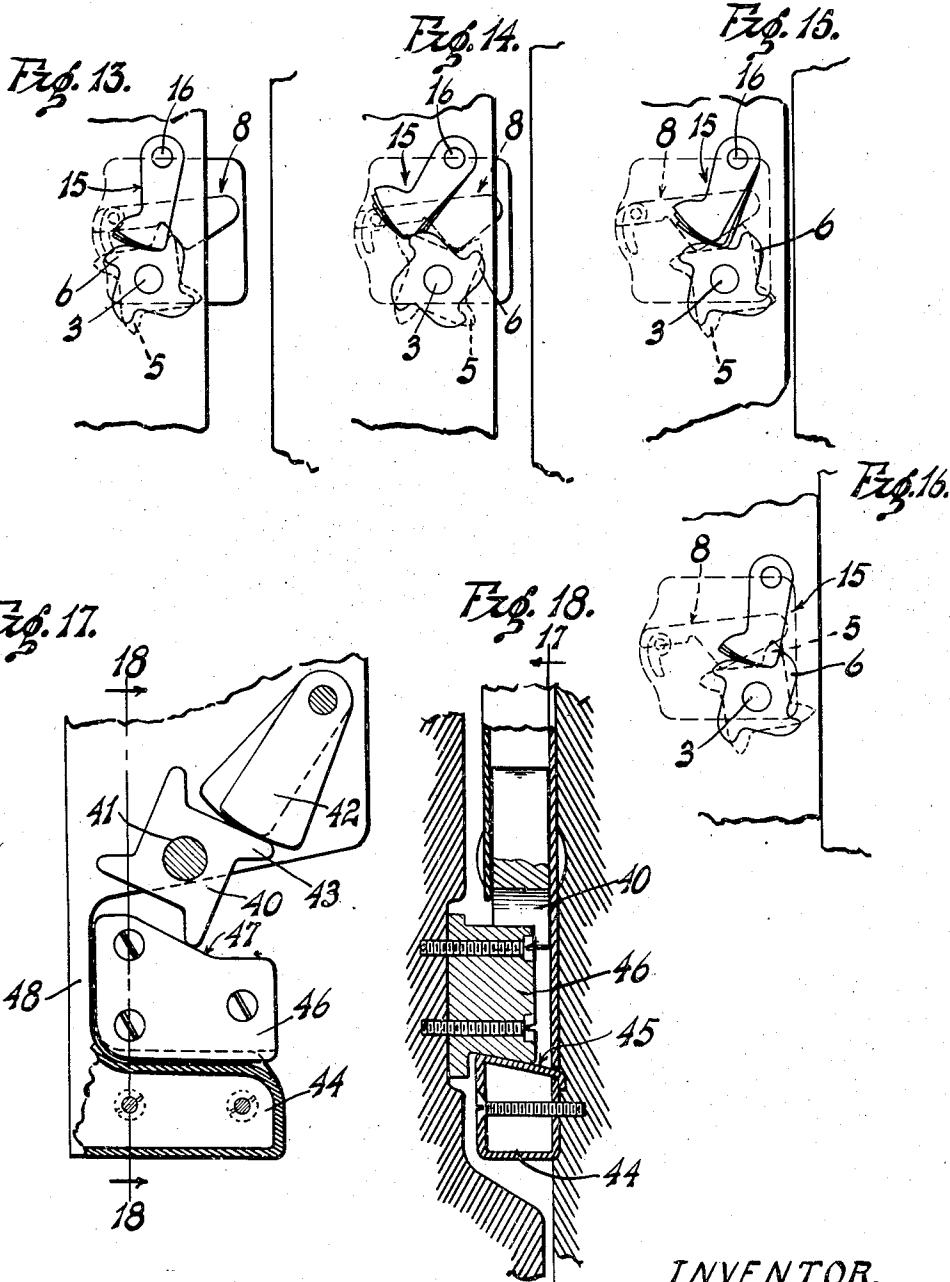
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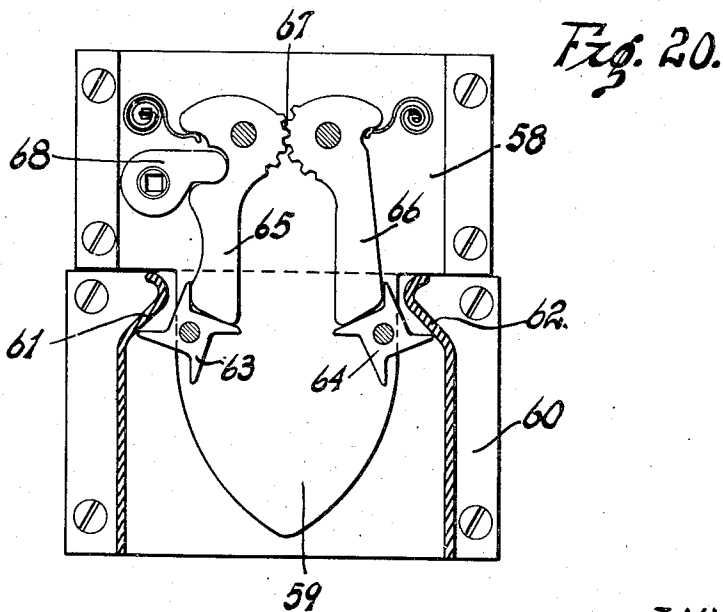
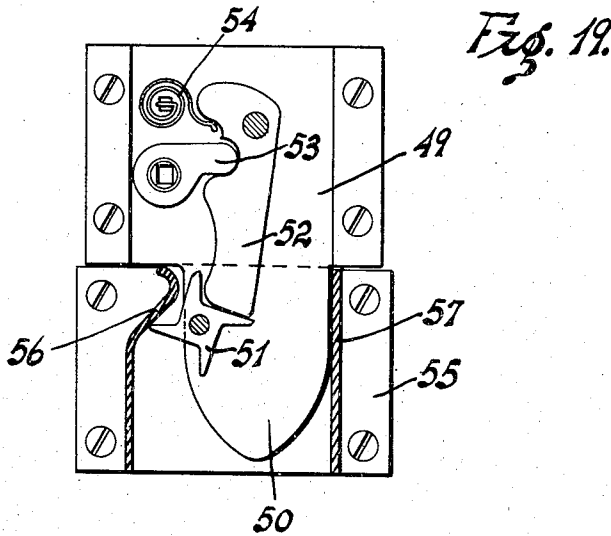
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4 Sheets-Sheet 4



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2,224,512

DOOR LATCH

Waldemar A. Endter, Long Beach, Calif.

Application October 17, 1936, Serial No. 106,243

25 Claims. (Cl. 292—214)

This invention relates to a novel door latch of the type having a rotary latch bolt and a novel means of dogging said bolt, said dogging means being easily operable and effectively guiding the latch bolt for the purpose of positively engaging and gripping a keeper.

This invention also relates to a novel keeper for door latches having a rotary latch bolt, the latch having a stationary guiding surface, the keeper cooperating with the guiding surface and with the rotary latch bolt whereby said keeper is clamped between the guiding surface and the bolt.

An object of my invention is to provide a novel door latch, the door being held against both horizontal and vertical movement.

A further object is to provide a novel strike plate or keeper which co-acts with the rotary bolt and also with a projecting lug on the latch so that the door is held in proper horizontal alignment.

Still another object is to provide a novel keeper which is clamped between the heads of a rotary bolt of the latch and a stationary lug on the latch thereby holding the door securely against both horizontal and vertical movement.

A feature of my invention resides in the novel means of actuating the dogging member for a rotary bolt whereby the dogging member is easily retracted.

Still another feature is to provide a novel door latch having a projecting surface thereon and a multi-headed rotary bolt, a head of the bolt and the projecting surface engaging and clamping a keeper with a vise-like action, the projecting surface providing a bearing opposite the heads of the bolt for the purpose of holding the door in one direction, and which permits the heads of the bolt to hold the door in alignment, and also in closed position.

A further object is to provide a novel means of dogging the rotary bolt whereby the heads on the bolt are urged against a keeper for the purpose of holding the door in closed position.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description, and the appended claims.

Figure 1 is a perspective view of the keeper in position about to enter the latch.

Figure 2 is a perspective view of the latch.

Figure 3 is a side elevation of the latch.

Figure 4 is a view taken at right angles to Fig. 3, and as viewed from the right, with parts broken away to show interior construction.

Figure 5 is a front view of the rotary bolt.

Figure 6 is a side elevation of the same.

Figure 7 is a front view of the keeper.

Figure 8 is a fragmentary diagrammatic perspective view of the latch and rotary bolt controlling means.

Figure 9 is a side view of the cam dogs.

Figure 10 is a side elevation of another form of latch embodying my invention.

Figure 11 is a view taken on line 11—11 of Fig. 12, and illustrating a further modified form of latch mechanism.

Figure 12 is a sectional view taken on line 12—12 of Fig. 11.

Figure 13 is a diagrammatic side elevation of the latch and keeper in the entering position.

Figure 14 is a view similar to Fig. 13, showing the keeper extended further into the latch.

Figure 15 is a view similar to Fig. 13, with the keeper still further extended into the latch.

Figure 16 is a view similar to Fig. 13, showing the latch and keeper in final closed position.

Figure 17 is a sectional view taken on line 17—17 of Fig. 18, and illustrating still another type of latch embodying my invention.

Figure 18 is a sectional view taken on line 18—18 of Fig. 17.

Figure 19 is a transverse sectional view of the latch and keeper in engaging position.

Figure 20 is still another modified form of latch and keeper shown in transverse section and in engaging position.

Referring more particularly to the drawings, and considering first, Figs. 1 to 9, inclusive.

My latch includes a frame 1 which is suitably attached to or mounted in a door or similar closure. A rotary bolt 2 is rotatably mounted in the frame 1 on a horizontal pin 3. This pin is suitably attached in the frame and the outer support is preferably a bracket 4 which extends from the outer surface of the frame. The rotary bolt 2 may consist of a plurality of latch heads 5 and a plurality of dogging heads 6. The dogging heads are slightly advanced over the latching heads in a counter-clockwise direction. The purpose of this construction will be further described.

A web 7 supports the heads 5 and 6 and also closes the opening in the frame 1 thru which the rotary bolt extends, thereby covering the inner structure and providing a lock which is simple in appearance, and also preventing dirt from accumulating on the operative parts of the latch.

The keeper 8 is preferably cast or formed of a single piece of metal and consists of a mounting

plate 9 and an inwardly projecting body 10. This body is formed with a spring pressed finger 11 in the forward end thereof, the purpose of which is to engage one of the heads 5 of the rotary bolt, and to act as a safety catch. A notch 12 in the lower face of the body 10 receives the head 5 when in the first safety catch position. Further rotation of the bolt 2 will then cause one of the heads 5 to engage the upwardly inclined surface 13. When the latch engages the keeper, a lug 14 projecting from the frame 1 bears against the top surface 14 of the keeper. As the rotary bolt 2 is dogged into locking position—as will be further described—a head 5 will press tightly against the surface 13 of the keeper and the keeper is thus gripped between the stationary lug 14^a and the head 5 of the bolt. This vise-like grip on the keeper will hold the door securely against both horizontal and vertical movement. The progressive positions of the keeper and the heads 5 of the rotary bolt are shown in dotted lines in Figs. 13 to 16, inclusive.

The upper surface 14 of the keeper is substantially horizontal altho it might be inclined slightly from the horizontal so that wear in the parts can be taken up by urging the closure further into its frame.

The rotary bolt 2 is dogged into position to clamp the keeper 8 by a plurality of dogs 15 which are pivotally mounted in the frame 1 on a pin 16. I have here shown three dogs, each of which is provided with a curved or cammed surface 17 on the lower end thereof which cammed surface engages one of the dogging heads 6. The cammed surfaces on the various dogs vary in curvature for the purpose of providing a continuing pressure against a head of the rotary bolt, thereby urging said bolt into latching position.

In Figs. 13 to 16, inclusive, the latching dogs are shown in various successive positions, and illustrate how certain of the dogs lead into the latching head of the bolt, while others—due to their difference in curvature—do not move into final home position until the door is completely closed.

Figure 13 shows the latch in safety notch position. Further movement of the door to closed position causes one of the rotary bolt heads to contact the surface 13 of the keeper which causes the bolt to rotate, as shown in Fig. 14, where the dogs have been pushed back by one of the other heads of the bolt and are about to trip to the other side of said head, as shown in Fig. 15. In the latter figure, the dogs are urging further rotation of the bolt in latching direction.

One of the dogs 15 is provided with a horizontal finger 18, which extends across all of the dogs for the purpose of simultaneously swinging the dogs when it is desired to release the bolt. The dogs are actuated by a retracting plate 19 which is slidably mounted in the frame 1. This plate is provided with a lug 20 engaging the finger 18. The cam 21 is actuated by the spindle 22 of the handle. On rotation of the handle the cam 21 presses the plate 19 downwardly, thus simultaneously swinging the dogs 15 away from the bolt 2. The dogging heads are thus released and the bolt is free to rotate so that the door or the like can be swung open.

Each of the dogs 15 is engaged by a spring 23 which urges the dogs into the bolt, the intention being to rotate said bolt against the keeper. These springs, thru their action against the dogs,

tend to constantly rotate the bolt into latching position, and thus any relative movement of the door and keeper will tend to further clamp the keeper and will urge the door into tighter closed position.

In Fig. 10 I have illustrated a modified form of latch particularly useful as a hood or deck latch, consisting of a frame 24 which is mounted on the closure member 25. A rotary bolt 26 is provided with a plurality of heads 27. Cam dogs 28 are pivotally mounted in the frame 24 and are urged against one of the heads 27 by a spring 29. These dogs are retracted by suitable means from the handle 30. A keeper 31 is engaged by the heads of the bolt 26 in the same manner as previously described. The keeper 31 is provided with an inclined bearing surface 32, the purpose of which is the same as the surface 13 previously described. The dogs 28 urge the heads 27 against the keeper 31 and the keeper is clamped between the heads, thereby holding the closure 25 in closed position.

In Figs. 11 and 12, a structure similar to that disclosed in Figs. 1 to 4, inclusive, is shown, with the exception that dogging heads are of a different type. The rotary bolt 33 is provided with latching heads 34 and with a plurality of inwardly extending dogging pins 35. These pins are circumferentially spaced and are engaged by a cam dog 36. The dog has a lower cam surface 37 which engages one of the pins 35, and in completely closed position, an adjacent pin 35 is engaged by the leading surface 38 of the dog. The dog is urged into latching position by a spring 39. The purpose and operation of the pin 35 are the same as the dogging heads 6 previously described.

In Figs. 17 and 18, a further modification is shown, illustrating a dovetail connection between the keeper and the stationary lug or bearing surface on the door. The rotary bolt 40 is rotatably mounted in the door on a pin 41. Suitable dogs 42 engage a head 43 on the bolt for the purpose of rotating the bolt into a latching position. The detailed construction of these dogs might be the same as previously described. The stationary lug 44 on the door is positioned adjacent to the bolt 40 and cooperates with the keeper for the purpose of holding the door securely in position. The upper surface of the lug 44 is inclined inwardly as shown at 45. The keeper 46 attached to the door frame, is provided with an upper inclined surface 47 which is engaged by a head 43 of the bolt. The lower surface of the keeper engages the lug 44 and this surface is also inclined to fit the surface 45. Thus, a dovetail connection is provided between the lug and the keeper, holding the door against spreading away from its frame. The keeper is clamped between the rotary bolt and the lug 44 in the same manner as previously described. The keeper 46 also bears against the stop 48 when the door is in closed position. That is, the keeper is clamped between the rotor 40, the bearing surface 44 and the stop 48.

In Fig. 19, I have illustrated a form of latch which is particularly applicable for hoods, or as a deck latch, or any similar arrangement. This latch consists of the case 49 which is secured to the door or closure. A guide plate 50 depends from the case 49. A rotary bolt 51 is journaled on the guide plate 50 and is engaged by the dog 52 which dog is also pivotally mounted on the case 49. The dog 52 is disengaged from the multi-headed bolt 51 by a manually actuated

finger 53. The usual spring 54 urges the dog into engagement with the bolt.

The keeper 55 is provided with an inclined latching surface 56 engaged by the bolt 51. A bearing surface 57 is provided on the keeper or on the door and this surface is engaged by the guide plate 50. When the parts are in latching position, the heads of the bolt 51 engage the inclined latching surface 56, and the guide plate 50 is pressed tightly against the bearing surface 57. Thus, the closure to which the latch case is secured, is firmly held in closed position. The same wedging action is produced in this modification as in the forms previously described.

In the form of latch shown in Fig. 20, the latch case 58 is provided with a depending guide plate 59. This guide plate enters the keeper 60 which keeper is provided with two inclined latching surfaces 61, 62. A pair of multi-headed rotary bolts 63, 64 are journaled on the plate 59 and engage the latching surfaces 61, 62, respectively. The bolts 63, 64 are engaged by cam dogs 65, 66, respectively. These two dogs are linked together by suitable means, such as the tooth 67, so that they will operate in unison. One of the dogs is swung on its pivot by the manually operated finger 68. In this form of my invention, each of the two bolts engages an inclined latching surface, thus effectively clamping and holding the closure in latched position.

Having described my invention, I claim:

1. A door latch comprising a frame, a multi-headed rotary bolt journaled in the frame, dogging means mounted in the frame, and adapted to engage the heads of the rotary bolt, manually operated means engaging the dogging means whereby said dogging means is moved out of engagement with the rotary bolt, a keeper, a projecting lug on the frame engaging one side of the keeper, the heads of said rotary bolt engaging the other side of the keeper whereby the keeper is clamped between said lug and said rotary bolt.

2. A door latch comprising a frame, a multi-headed rotary bolt journaled in the frame, a cam dog mounted in the frame and adapted to engage a head of the rotary bolt, manually operated means engaging the dog whereby the dog is moved out of engagement with the rotary bolt, a keeper, a lug projecting from the case and engaging one side of the keeper, a head of the rotary bolt engaging the other side of the keeper, the face of the keeper engageable by the rotary bolt being disposed at an angle to the surface engaging the projecting lug whereby the keeper is clamped between the lug and the rotary bolt.

3. In a door latch for closures, a projecting surface on the closure, a multi-headed rotary bolt mounted on the closure, dogging means engageable with one of the heads of the rotary bolt, said bolt being capable of further rotation in latching direction while in latched position by the action of the dogging means, a keeper engageable by the bolt heads, the heads on the rotary bolt being arranged opposite to the projecting bearing surface on the closure for the purpose of creating a vise-like grip on a keeper, when in latching position.

4. A door latch for a closure, including a projecting surface on the closure, a rotary bolt mounted on the closure, dogging means engaging the rotary bolt, said bolt being capable of further rotation in latching direction while in a latched position by means of said dogging means, said rotary bolt being fixedly journaled on the

closure, a keeper including a horizontal surface and a second surface inclined to the horizontal surface, said bolt engaging the inclined surface of the keeper and tightly pressing thereon, the projecting surface on the closure bearing against the horizontal surface of the keeper, said keeper being clamped between the rotary bolt and the projecting surface on the closure.

5. A door latch comprising a frame, a stationary projecting lug on the frame, a keeper, a bearing surface on the keeper adapted to bear against said lug for the purpose of restraining movement in one direction, a second bearing surface on the keeper inclined to the first named bearing surface, a rotary bolt, said rotary bolt being adapted to bear against the second bearing surface for the purpose of restraining movement in one direction, said bearing surfaces cooperating to form a wedge whereby the latch is restrained from movement in an outward direction, and at the same time held in alignment, dogging means engaging the rotary bolt whereby said rotary bolt is fixedly held pressed against said second surface.

6. A door latch comprising a frame, a stationary lug projecting from said frame, a keeper, a bearing surface on the keeper adapted to bear against said lug for the purpose of yieldably restraining movement thereof in one direction, a second bearing surface on the keeper arranged at an angle to the first named surface, a multi-headed rotary bolt journaled in the frame, the heads of said bolt bearing against the second bearing surface for the purpose of restraining movement thereof in one direction, said bearing surfaces cooperating to form a wedge whereby the lug is restrained from movement in an outer direction and yieldably restrained from movement in a vertical direction, and at the same time held in alignment, and dogging means engaging the rotary bolt whereby said bolt is fixedly held pressed against said second surface.

7. In a latch construction, a rotary bolt capable of free rotation in all positions when released, including a plurality of heads, any one of which is adapted to engage a keeper, dogging heads on the rotary bolt, cam dogging means engageable with any one of the dogging heads, said cam dogging means imposing a continuous rotation of the bolt in a latching direction when the bolt is in keeper-engaging position, said keeper including a substantially horizontal surface, a second surface arranged at an angle to the first named surface, a fixed lug on the latch, said first named surface engaging the lug, and the head on the rotary bolt engaging the second surface.

8. In a latch construction, a rotary bolt capable of free rotation in all positions when released, including a plurality of heads, any one of which is adapted to engage a keeper, a dogging mechanism adapted to engage successive heads of the bolt in non-latching position, said dogging mechanism including pivotally mounted cam dogs, the cam dogs imposing a continued rotation of the bolt in a latching direction when one of the heads is in keeper-engaging position, said rotary bolt including a plurality of keeper-engaging heads on one side thereof, and a plurality of pins on the other side thereof, said cam dogs being adapted to engage said pins.

9. In a latch construction, a rotary bolt, capable of free rotation in all positions when released, including a plurality of heads, any one of which is adapted to engage a keeper, a plurality of dogging heads on the rotary bolt, cam dogging means

engageable with any one of the dogging heads, said cam dogging means imposing a continuous rotation of the bolt in a latching direction when the bolt is in keeper engaging position.

10. In a latch construction, a frame, a rotary bolt mounted in the frame, said bolt being capable of free rotation in all positions when released, including a plurality of keeper engaging heads, any one of which is adapted to engage a keeper, a plurality of dogging heads on the rotary bolt, a cam dog pivotally mounted in the frame and engageable with any one of the dogging heads, said dog having a cam face cooperating with one of the dogging heads thus imposing a continual rotation of the bolt in a latching direction when the bolt is in keeper engaging position.

11. In a latch mechanism, a securing means mounted for pivotal movement for engagement with a part, and a plurality of normally projectable elements arranged side by side adapted to cooperate with said means and including portions acting successively to exert a camming action on said means to maintain said means in engagement with said part with a continuous camming effect.

12. A latch for association with two relatively movable members comprising a stationary abutment carried by and projecting from one of said members, a keeper carried by the other member and having a bearing surface adapted to bear against said abutment, said keeper having a second bearing surface on the keeper, a multi-headed rotary bolt journaled in said one member, each of said heads of said bolt being disposed to bear against the second bearing surface, said bearing surfaces cooperating to form a wedge received between the abutment and the bolt whereby the members are secured in latched position, and dogging means engaging the rotary bolt whereby said bolt is fixedly held pressed against said second surface.

13. A latch for association with two relatively movable members comprising a stationary abutment carried by and projecting from one of said members, a keeper carried by the other members and having a bearing surface adapted to bear against said abutment, said keeper having a second bearing surface on the keeper, a multi-headed rotary bolt journaled in said one member, each of said heads of said bolt being disposed to bear against the second bearing surface, said bearing surfaces cooperating to form a wedge received between the abutment and the bolt whereby the members are secured in latched position, and a plurality of cam elements operatively associated with the bolt so as to have a progressive camming action thereon and hold said bolt in engagement with said second surface.

14. In a latch mechanism for association with two relatively movable members, a rotary securing means carried by one member and having a first series of heads any one of which is engageable with a cooperating part carried by the other member, said means having a second series of heads, cam means arranged to cooperate with the heads of the second series, said cam means being so arranged relative to said securing means as to have a progressive camming action on said means and maintain a head of said first series in engagement with said part with a continuous camming effect.

15. In a latch mechanism for association with relatively movable members, the combination of a multi-headed bolt having a plurality of angularly spaced heads, said bolt being rotatably mounted

on one of the members, a keeper mounted on the other member and formed to cause the bolt to rotate in one direction during a closing movement of the members and to rotate in the other direction during an opening movement between the members, said keeper having a part against which a head of the bolt bears when the members are in closed position, said keeper having bolt engaging portions formed to cause the bolt to rotate a different amount during a closing movement than during an opening movement, whereby in successive closing actions said keeper part engages successive ones of said heads.

16. In a latch mechanism for association with relatively movable members, a securing means carried by one member for engagement with a part carried by the other member, and a plurality of cam elements arranged to cooperate with said securing means, said cam elements being so arranged relative to said means that they have a progressive camming action on said means and maintain said means in engagement with said part with a continuous camming effect.

17. In a latch mechanism for association with relatively movable members, a securing means carried by one member for engagement with a part carried by the other member, and a plurality of cam elements arranged to cooperate with said securing means, said cam elements being of progressively increasing size and so positioned relative to said means that they have a progressive camming action on said means and maintain said means in engagement with said part with a continuous camming effect.

18. In a latch mechanism for association with relatively movable members, a securing means carried by one member for engagement with a part carried by the other member, and a plurality of cam elements arranged to cooperate with said securing means, said cam elements being mounted for pivotal movement relative to said means and being arranged to have a progressive camming action on said means and maintain said means in engagement with said part with a continuous camming effect.

19. In a latch mechanism for association with relatively movable members, a securing means carried by one member for engagement with a part carried by the other member, and a plurality of cam elements arranged to bear against said securing means, said cam elements being so arranged relative to said means that they have a progressive camming action on said means and maintain said means in engagement with said part with a continuous camming effect.

20. In a latch mechanism for association with relatively movable members, a securing means carried by one member for engagement with a part carried by the other member, a plurality of cam elements arranged to cooperate with said securing means, said cam elements being so arranged relative to said means that they have a progressive camming action on said means and maintain said means in engagement with said part with a continuous camming effect, and means for retracting said cam elements so as to relieve said camming effect.

21. In a latch for association between two relatively movable members, a bolt arranged for pivotal movement on one member and rotatable into engagement with a keeper on the other member as said members move towards closed position, separate elements acting successively and automatically to hold said dog and keeper in locked

position as said parts move to closed position whereby the device may function effectively irrespective of variation in the fit between said parts.

5 22. In a latch for association between two relatively movable members, a bolt on one member for engaging a keeper on the other member, and a plurality of pivoted pawls for holding said dog
10 in locking engagement with said keeper, said pawls being of different lengths so that successive pawls may function to hold said dog as its locking position varies in accordance with irregularities of the parts on which the keeper and dog are mounted.

15 23. In a latch mechanism for association with relatively movable members, a securing means carried by one member for engagement with a part carried by the other member, a plurality of cam elements arranged to cooperate with said
20 securing means, said cam elements being so arranged relative to said means that they have a progressive camming action on said means and maintain said means in engagement with said part with a continuous camming effect, means for
25 retracting one of said cam elements so as to release the camming effect thereof, and means so arranged that said retracting movement of said one cam element causes a retracting movement of another of said cam elements.

30 24. In a latch mechanism for association with relatively movable members, a securing means

carried by one member for engagement with a part carried by the other member, a plurality of cam elements arranged to cooperate with said securing means, said cam elements being so arranged relative to said means that they have a
5 progressive camming action on said means and maintain said means in engagement with said part with a continuous camming effect, means for retracting one of said cam elements so as to release the camming effect thereof, and a connection between said cam elements so that said retracting movement of said one cam element causes
10 a corresponding retracting movement of another cam element.

25. In a latch and dovetail mechanism for association with a door member and a pillar member, the combination of a pair of spaced abutments carried by one of the members, one of the abutments being formed as a lock keeper, means carried by the other member and including a rotatably mounted bolt, said means being disposed between the two abutments when the door is closed, the bolt having a plurality of heads any one of which is engageable with the lock keeper abutment when the door is closed so as to hold the
20 door in locked position and to wedge the said means between the two abutments; and cam means acting on the bolt with a continuous camming action so as to tend to rotate the bolt and produce said holding and wedging action.
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