Jan. 10, 1956 W. M. RIES 2,730,393

LATCH

Filed July 27, 1951 2 Sheets-Sheet 1

Fig. 1.

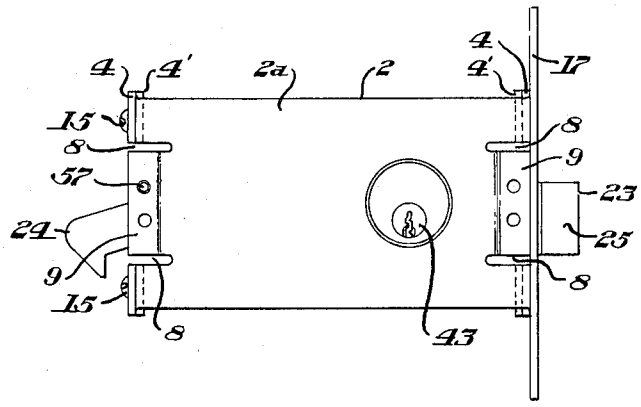


Fig. 3.

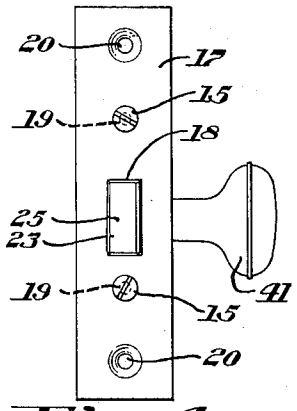


Fig. 2.

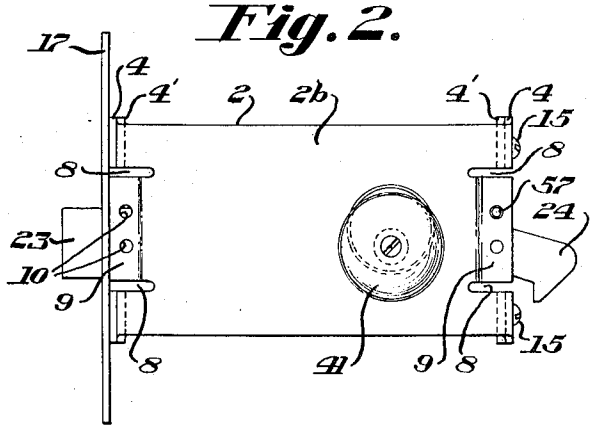


Fig. 4.

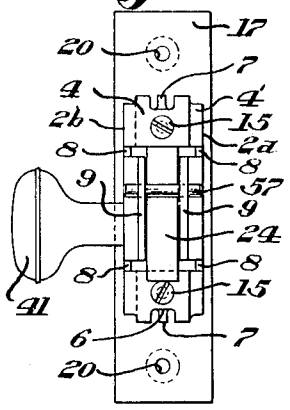


Fig. 5.

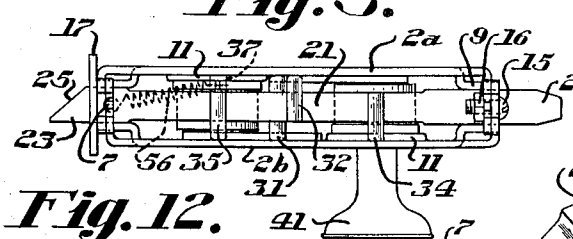


Fig. 11.

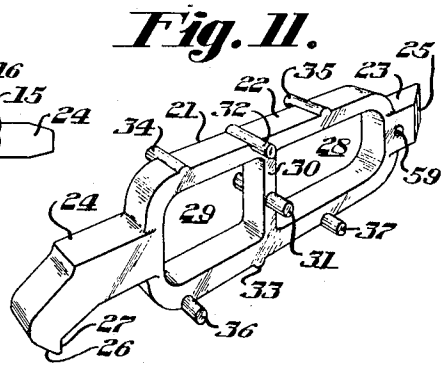


Fig. 12.

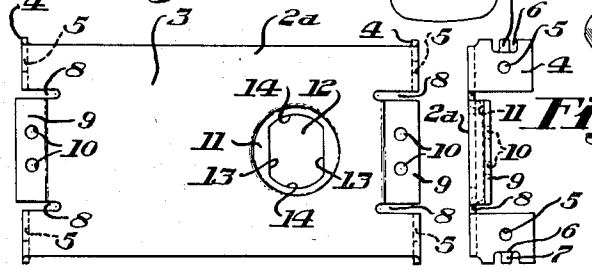


Fig. 13.

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Fig. 6.

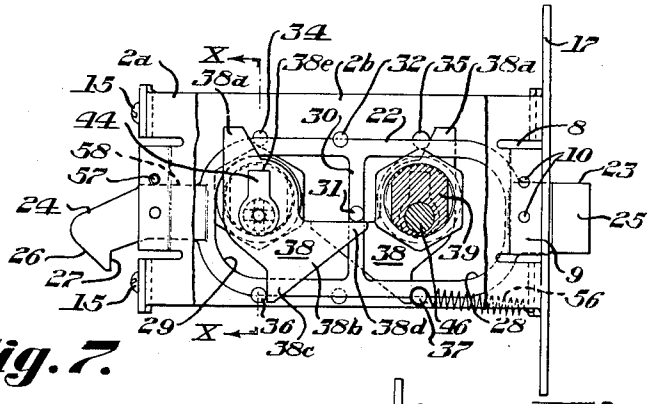


Fig. 7.

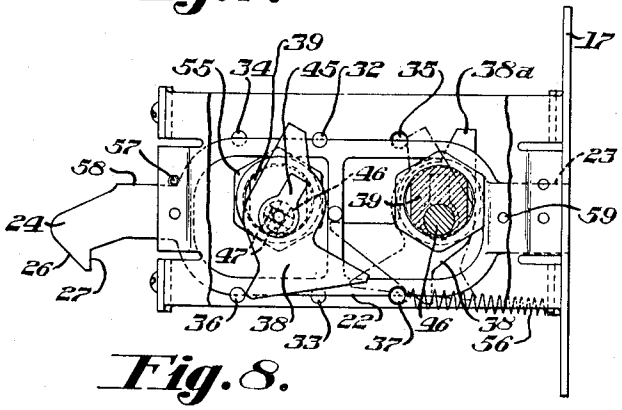


Fig. 10.

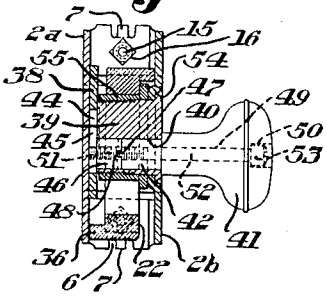


Fig. 8.

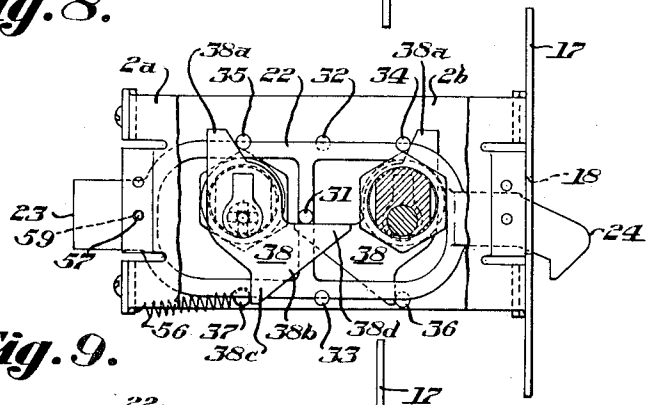
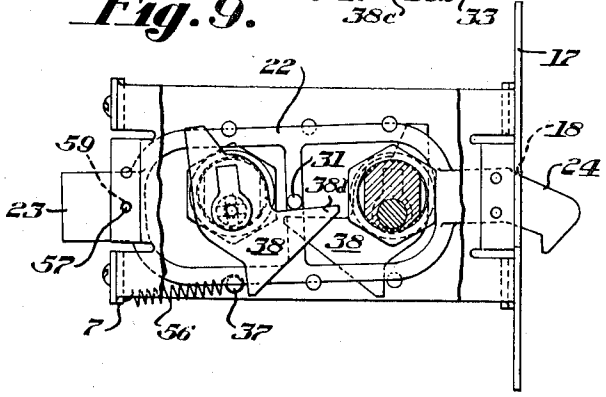


Fig. 9.



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United States Patent Office 2,730,393 Patented Jan. 10, 1956

2,730,393

LATCH

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Application July 27, 1951, Serial No. 238,913

23 Claims. (Cl. 292—244)

This invention relates to latches and more particularly to latches adapted to be employed in doors. The invention comprises improvements in latches which enhance their utility and increase their adaptability.

In the design of structures employing doorways with doors mounted at the doorways for movement between open and closed positions it has been customary to completely design the structure even as to the side of the doorway at which the door is to be mounted and the direction in which the door is to swing or slide toward closed position and parts adapted specifically for the particular installation as designed have been specified. However, there are occasions when it is desired to postpone determination as to just how doors are to be mounted relatively to their respective doorways until near completion of the structure. This is especially true in respect of industrial structures such as shop partitions and the like. It may be difficult to determine at the time of designing a shop partition just how each door should be mounted, i. e., whether it should be a sliding door or a swinging door, if a sliding door toward which side of the doorway it should open and if a swinging door to which side of the doorway it should be hinged and in which direction it should swing when being opened. Yet heretofore it has been considered necessary to initially completely design the structure even to the type of each door and the relationship to the doorway in which the door is mounted. This has made it difficult or impossible to mount doors differently than in accordance with the original design when near completion of the structure it appears that the original design was not in all respects desirable insofar as the types of doors selected and the relationship to their respective doorways in which they were designed to be mounted are concerned.

I have devised a latch which is universally adaptable for sliding and swinging doors, for right-hand and left-hand doors and for doors which if of the swinging type swing either inwardly or outwardly. Use of my latch makes it possible to postpone until near completion of a structure determination of the question as to how each door is to be hung yet without incurring delay in obtaining special latches when the determination has been made.

Other details, objects and advantages of the invention will become apparent as the following description of a present preferred embodiment thereof proceeds.

In the accompanying drawings I have shown a present preferred embodiment of the invention in which:

Figure 1 is a face view of a latch;

Figure 2 is a face view of the latch shown in Figure 1 viewed from the opposite face;

Figure 3 is an end view of the latch shown in Figures 1 and 2 as viewed from the right in Figure 1;

Figure 4 is an end view of the latch shown in Figures 1–3 as viewed from the right in Figure 2;

Figure 5 is an edge view of the latch shown in Figures 1–4 as viewed from the top in Figure 2;

Figure 6 is a view similar to Figure 1 with portions cut away to show the interior structure, the bolt being mounted for generally rectilinear movement and being shown in projected position;

Figure 7 is a view similar to Figure 6 showing the bolt retracted;

Figure 8 is a view similar to Figure 6 but with the bolt mounted for angular instead of generally rectilinear movement, the bolt being shown in its lower or operative position;

Figure 9 is a view similar to Figure 8 showing the bolt in its uptilted or inoperative position;

Figure 10 is a transverse cross-sectional view taken on the line X—X of Figure 6;

Figure 11 is a perspective view of the bolt;

Figure 12 is a face view of one of the two opposed casing members; and

Figure 13 is an end view of the casing member shown in Figure 12 as viewed from the right in that figure.

The latch casing is designated generally by reference numeral **2** and comprises two identical opposed casing members **2***a* and **2***b*. Figures 12 and 13 show the structure of the casing member **2***a* and since the casing members **2***a* and **2***b* are identical Figures 12 and 13 also show the structure of the casing member **2***b*. Each of such casing members is made out of sheet or plate metal and comprises a generally planar body portion **3** of generally elongated rectangular shape having at each end adjacent each longitudinal edge a flange integral with the body portion and turned at right angles thereto. Thus there are four such flanges on each casing member. The flanges at one end of the casing member are of the same shape as each other and the flanges at the opposite end of the casing member are of the same shape as each other and of the same shape as the flanges at the first mentioned end except for an added projection to which reference will be made below whose purpose is to provide an anchor for a coil spring biasing the bolt. The flanges at one end of the casing member are designated **4**, each being of generally rectangular shape but having a circular hole **5** therethrough and having a recess **6** in the edge thereof which forms a continuation of the corresponding longitudinal edge of the body portion **3**. The flanges at the other end of the casing member are designated **4'** and are identical with the flanges **4** except that each flange **4'** has an added projection **7** projecting into the recess thereof which corresponds to the recess **6** of each of the flanges **4**. The function of each of the projections **7** is to provide an anchor for a coil spring biasing the bolt as will appear below.

Each of the casing members **2***a* and **2***b* has a pair of longitudinal parallel slots **8** in each end thereof extending parallel to the longitudinal edges of the casing member and providing therebetween a tongue **9**. Each of the tongues **9** is integral with the body portion but is deformed out of the plane of the body portion and is itself generally planar and lies in a plane generally parallel to the plane of the body portion disposed at the side of the body portion toward which the flanges **4** and **4'** project. Each tongue **9** has two circular holes **10** therethrough.

Each of the casing members **2***a* and **2***b* has formed therein closer to one of its ends than to the other end a circular depression **11** and through the depression **11** is formed an opening **12** of generally elongated shape with straight sides **13** extending generally parallel to the short dimension of the casing member and curved ends **14** joining the straight sides as clearly shown in Figure 12.

In assembling the casing the two identical casing members **2***a* and **2***b* are disposed with their flanges **4** and **4'** toward each other and with the openings **12** in non-opposed relation. This results in the flanges **4** of each of the casing members being opposed to the flanges **4'** of the other casing member. The casing members are

brought together so that the flanges of one overlap the flanges of the other and they are fastened together by bolts **15** passing through the holes **5** of the overlapped flanges and having nuts **16** applied thereto. Thus there is formed by the use solely of two identical casing members, four bolts and four nuts a latch casing which has an inner space for containing the latch bolt and bolt operating mechanism and an opening at each end (formed between the opposed faces of the respective tongues **9** and between the inner edges of the respective flanges **4** and **4'**) so that the bolt may have its operative end projecting selectively through either end of the casing. There is applied to the end of the casing through which the operative end of the bolt projects a plate **17** which is an elongated rectangular plate of sheet or plate metal having through the center thereof a rectangular opening **18** through which the operative end of the bolt is adapted to extend and also having therethrough an inner pair of bolt holes **19** and an outer pair of bolt holes **20**. The inner pair of bolt holes **19** have the same spacing as the holes **5** of the casing members **2***a* and **2***b*. When the casing members **2***a* and **2***b* are assembled the bolts **15** which hold them together at one end also pass through the bolt holes **19** of the plate **17** and thus attach and hold in place to the casing the plate **17**. When the casing members **2***a* and **2***b* and the plate **17** are assembled the flanges **4** and **4'** of the casing members are so disposed relatively to each other that the plate **17** lies against the flanges **4** of one of the casing members. When the casing members are assembled the flanges **4'** having the added projections **7** are disposed toward the inside of the casing relatively to the flanges **4**. The bolt holes **20** are for bolting the latch to the door to which it is to be applied. When the latch is applied to the door it is inserted into a suitable recess provided in the door with the plate **17** disposed at the edge of the door and extending beyond the recess so that attaching bolts passing through the bolt holes **20** also pass through a portion of the door to hold the latch in place relatively to the door. Screws instead of bolts may be used for fastening the latch to the door.

The latch bolt is shown in perspective in Figure 11. It is designated generally by reference numeral **21** and comprises a body **22** having latching portions **23** and **24** respectively connected therewith and projecting therefrom in opposite directions. The latching portions **23** and **24** are of different construction and are selectively usable as the operative portion of the bolt depending upon whether the bolt is mounted in the casing for sliding movement or for swinging movement. When the bolt is mounted in the casing for sliding movement the latching portion **23** is the operative portion of the bolt. When the bolt is mounted in the casing for swinging movement the latching portion **24** is the operative portion of the bolt. The bolt is mounted in the casing for sliding movement when the latch is used in a swinging or hinged door and the bolt is mounted in the casing for swinging movement when the latch is used in a sliding door. The latching portion **23** has an inclined end face **25** which when the bolt is disposed in generally horizontal position is oriented substantially vertically, which is characteristic of sliding bolts used in swinging doors. The inclined end face **25** is adapted to engage a portion of the door frame when the door is swung shut, such engagement resulting in camming back the bolt until the door reaches fully closed position when the bolt is projected by its spring behind the portion of the frame referred to to maintain the door closed. The latching portion **24** has an inclined end face **26** which when the bolt is disposed in generally horizontal position is oriented at an angle to the vertical, which is characteristic of swinging bolts used in sliding doors. The inclined end face **26** is adapted to engage a portion of the door frame when the door is slid shut, such engagement resulting in tilting the bolt until the door reaches fully closed position when the bolt is swung down either by its spring or by gravity or both so that the hook portion **27** thereof lies behind the portion of the frame referred to to maintain the door closed.

Through the body portion **22** of the bolt are two openings **28** and **29** respectively. The openings **28** and **29** are separated from each other by a rib **30** through which passes a pin **31** projecting at both faces of the bolt as shown in Figure 11. Considering the bolt to be oriented horizontally and disposed in a generally vertical plane as indicated in Figure 11, a pin **32** integral with the bolt is disposed at the edge of the bolt above the pin **31** and a pin **33** integral with the bolt is disposed at the edge of the bolt below the pin **31**, the pin **32** projecting past only one face of the bolt while the pin **33** projects past only the opposite face of the bolt. At the edge of the bolt at which the pin **32** is disposed and positioned so that the pin **32** lies therebetween are pins **34** and **35** integral with the bolt which project past only the face of the bolt opposite the face past which the pin **32** projects. At the edge of the bolt at which the pin **33** is disposed and positioned so that the pin **33** lies therebetween are pins **36** and **37** integral with the bolt which project past only the face of the bolt opposite the face past which the pin **33** projects. Thus the pins **31**, **32**, **36** and **37** project past one face of the bolt while the pins **31**, **33**, **34** and **35** project past the opposite face of the bolt. All of the pins project substantially the same distance beyond the respective faces of the bolt. The total length of the pin **31** is slightly less than the distance between the inner faces of the body portions **3** of the casing members **2***a* and **2***b* when they are assembled as above described. The thickness of the body portion **22** and the latching portions **23** and **24** of the bolt in the direction parallel to the axes of the pins is slightly less than the distance between the inner faces of the opposed tongues **9** of the casing members. Thus the bolt is by the pins which are disposed between the inner faces of the body portions **3** of the casing members **2***a* and **2***b* and the latching portions **23** and **24** which are disposed between the opposed tongues **9** maintained generally in operative orientation within the casing. The bolt **21** may be cast, in which case the pins **31**, **32**, **33**, **34**, **35**, **36** and **37** may be cast integral therewith.

The bolt is adapted to be operated by either of two identical cams **38** of sheet or plate metal, the cams **38** having the shape shown in Figures 6, 7, 8 and 9. Each thereof has a projection **38***a* extending in one direction and a projection **38***b* extending in the opposite direction, the projection **38***b* having opposed operating corner portions **38***c* and **38***d* respectively. Each cam **38** has generally centrally located a generally keyhole-shaped cutout **38***e*. The respective cams **38** are positioned within the casing so that one thereof lies against one face of the bolt and the other thereof lies against the other face of the bolt.

There is mounted in each of the openings **12** a cylinder lock case **39** having the usual provision for lock tumblers and the usual cylindrical bore **40** into which a bolt operating device may be inserted. The bolt operating device may be a lock cylinder or it may be a device other than a lock cylinder such as the knob **41** having a reduced cylindrical shank **42** rotatably received within the bore **40**. When the bolt operating device is a lock cylinder the cylinder and the case **39** are provided with the usual tumblers so that the cylinder may be turned only by the use of a key shaped to operate the tumblers to permit turning of the cylinder as well known to those skilled in the lock art.

As will be understood from what is stated above, it is optional whether provision be made to operate the bolt by a lock cylinder or operating means other than a lock cylinder from either side of the door. Lock cylinders may be used at both sides of the door or operating devices other than lock cylinders may be used at both sides of the door or a lock cylinder may be used at one side of the door and a device other than a lock cylinder at the opposite side of the door. In the draw-

ings the knob 41 which requires no key for its operation is used at one side of the door and a lock cylinder 43 which requires a key for its operation is used at the other side of the door.

Referring to Figure 10, a cam turning device 44 cooperates with the knob 41. The cam turning device 44 comprises a generally plate-like portion 45 of generally keyhole shape and a generally cylindrical portion 46 integral therewith and projecting in one direction therefrom, the portion 46 being adapted to have an operating fit within the bore 40 of the case 39 with which the knob 41 is used. The portion 46 of the cam turning device 44 enters the bore 40 from the inside of the case. In the extremity of the portion 46 are two intersecting cross slots 47 adapted selectively to receive a projection 48 at the inner end of the shank 42 of the knob 41 so that when the cam turning device 44 is applied to the bore 40 from the inside of the case and the knob 41 is applied to the bore 40 from the outside of the case the knob will be operatively connected with the cam turning device to turn the same when the knob is turned. The projection 48 of the knob enters only one of the cross slots 47 of the device 44. When a round knob is used it is immaterial which cross slot the projection 48 enters. However, instead of using a round knob a lever type knob or handle may be used and the orientation of the lever will be determined by which of the slots in the cam turning device the projection at the inner end of the lever shank enters. If it is desired that the lever be normally oriented in generally horizontal position the projection will enter one slot while if it is desired that the lever be normally oriented in generally vertical position the projection enters the other slot.

The knob 41 has therethrough a bore 49 enlarged adjacent the outer end of the knob as indicated at 50. The cam turning device 44 has a threaded bore 51. When the parts have been assembled as above described so that the projection 48 of the knob enters one of the cross slots 47 of the cam turning device 44 a screw 52 is introduced through the bore 49 and threaded into the bore 51 to maintain the knob 41 and the device 44 assembled, the head 53 of the screw being concealed within the enlarged outer portion 50 of the bore. The portion 45 of the cam turning device 44 is as above mentioned, of generally keyhole shape and is adapted to snugly enter the cutout 38*e* of one of the cams 38. A similar generally keyhole-shaped plate is applied to the inner end of the lock cylinder 43, as by being screwed or otherwise fastened in non-rotative relation thereto, and is adapted to snugly enter the cutout 38*e* of the other cam 38. Each of the cases 39 has an outer circular flange 54 substantially filling the circular depression 11 of the casing member to which it is applied and the body of the case is shaped to snugly fit within the opening 12 and is maintained in place by a nut 55 threaded onto the inner end thereof and turned up against the inner face of the casing at the depression 11. The conforming non-circular shape of the opening 12 and the portion of the case 39 passing therethrough holds the case against turning relatively to the lock casing 2.

Each of the bolt operating devices passes through one of the openings 28 and 29 of the bolt 21, the accessible portion thereof (the knob 41 or lock cylinder 43 as the case may be) being at one face of the casing 2 while the cam 38 operated thereby is at the opposite face of the casing. In other words, each of the bolt operating devices operates through one of the openings of the bolt and acts on the bolt at the face thereof remote from the face of the casing at which the external force for operating the bolt is applied. Each of the cams 38 lies between one of the side faces of the bolt and the inside of the lock casing and is operatively connected with the keyhole-shaped cam turning device to which it is applied by fitting its keyhole-shaped cutout about the cam turning device. In other words, there is no need of providing any fastening means for the cams 38 since they are confined between the bolt and the respective inside faces of the casing 2 so that they cannot lose their operative connection with the respective cam turning devices without disassembling the casing.

The bolt 21 is supported in the casing by the nuts 55 which lie within the openings 28 and 29, respectively, of the bolt. Normally the surfaces defining the tops of the openings 28 and 29 of the bolt ride upon the topmost surfaces of the nuts 55. When the bolt is mounted as a sliding bolt it is supported by the nuts 55 at virtually all times. When the bolt is mounted as a swinging or tilting bolt it is supported by the nuts 55 when in operative position. Actually it is also supported by the pin 57; in the structure shown when the bolt when mounted as a swinging bolt is in operative position as shown in Figure 8 it is supported by the pin 57 and also by the two nuts 55. When the bolt is swung or tilted to inoperative position as shown in Figure 9 it rises out of contact with the nuts 55.

A tension coil spring 56 is applied between the bolt and the casing, having one end anchored to one of the pins of the bolt and the other end anchored to one of the projections 7 of the casing to normally urge the bolt toward operative position.

The parts may be assembled to provide a latch having a sliding latch bolt for a door hinged from either edge and swinging either inwardly or outwardly or latch having a swinging or tilting latch bolt for a sliding door. Figures 1-7 and 10 show a latch having a sliding latch bolt while Figures 8 and 9 show a latch having a swinging or tilting latch bolt. In the form of Figures 1-7 and 10 the latching portion 23 projects through the plate 17 and the bolt is biased toward operative position by anchoring the spring 56 between the pin 37 and the projection 7 at the lower front corner of the casing (the front of the casing being considered as the end at which the plate 17 is applied which is disposed at the edge of the door). A pin 57 passes through the upper opposed holes 10 at the rear of the casing. The pin 57 is not always essential when the bolt is mounted for sliding movement and may in some instances be dispensed with. However, it restrains any tendency which the rear end (i.e., the left-hand end viewing Figures 6 and 7) of the bolt may have to rise during operation of the latch as the upper surface 58 of the portion 24 rides substantially against or very close to the bottom of the pin as the bolt moves back and forth. The pin is provided for use when the bolt is mounted as a swinging or tilting bolt as will presently appear and it is recommended that it be applied as shown in Figures 6 and 7 when the bolt is mounted as a sliding bolt although the latch may be operative if the pin is not so employed.

With reference to Figures 6 and 7, the bolt may be retracted by either of the cams 38. The left-hand cam 38 viewing Figures 6 and 7 is disposed at the face of the face of the bolt nearer the eye, that being the face of the bolt from which the pin 36 projects. When the left-hand cam 38 is turned in the clockwise direction viewing Figures 6 and 7 the portion 38*c* thereof engages the pin 36 and retracts the bolt. The right-hand cam 38 viewing Figures 6 and 7 is disposed at the face of the bolt remote from the eye and when it is turned in the counterclockwise direction the portion 38*a* operates against the pin 35 to retract the bolt. When no force is being exerted against the bolt to retract it or hold it in retracted position spring 56 returns it to operative position.

Referring now to Figures 8 and 9, the bolt is shown in those figures as being mounted for swinging or tilting movement. A circular hole 59 is provided in the portion 23 of the bolt and the pin 57 is inserted through the hole 59 and the lower opposed holes 10 at the rear of the casing as shown in Figures 8 and 9, the portion 24 of the bolt projecting through the plate 17. Thus the pin 57 holds the bolt against translatory movement in

the casing but permits turning of the bolt about the pin as an axis. The spring **56** is anchored between the pin **37** and the projection **7** at the lower rear corner of the casing and tends to turn the bolt in the clockwise direction about the pivot pin **57**, i. e., so as to draw downwardly the portion **24** of the bolt. The bolt may be turned in the counterclockwise direction viewing Figures 8 and 9 about the pivot pin **57** by either of the cams **38**. For thus turning the bolt the pin **31** is utiltized. When the left-cam **38** viewing Figures 8 and 9 is turned in the counterclockwise direction the portion **38***d* thereof engages beneath and forces upwardly the pin **31**, thus swinging the bolt about the pivot pin **57** to raise the portion **24** thereof. Similarly when the right-hand cam **38** viewing Figures 8 and 9 is turned in the clockwise direction the portion **38***d* thereof engages beneath and forces upwardly the pin **31**, thus swinging the bolt about the pivot pin **57** to raise the portion **24** thereof.

It will be understood that when closing the door it is unnecessary to operate the bolt except through the action thereon of the portion of the door frame (normally a strike plate attached to the door frame) which acts against the inclined face **25** or **26** of the bolt, depending upon whether the bolt is being used as a sliding bolt in a swinging door or as a swinging bolt in a sliding door, and after the door has closed the spring **56** will move the bolt to operative position to maintain the door closed until the bolt is retracted by one or the other of the bolt operating devices. Retraction of the swinging bolt means turning of it in the counterclockwise direction viewing Figures 8 and 9 about the pivot pin **57** so as to raise the hook portion **27** to a level above that of the cooperating portion of the strike plate.

Features disclosed but not claimed herein are disclosed and claimed in the copending application of Richard Raper, Serial No. 238,968, filed of even date herewith, now Patent No. 2,695,805 issued Nov. 30, 1954.

While I have shown and described a present preferred embodiment of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. A latch comprising a casing comprising opposed plates each having ears projecting toward the other, means connecting together the ears of the respective plates constituting the only means holding the plates together, a bolt disposed between the plates, a portion of the bolt projecting from between the plates, and means for moving the bolt relatively to the plates.

2. A latch comprising a casing comprising opposed casing members each having portions projecting toward the other casing member, such portions of the respective casing members overlapping, a bolt disposed between the casing members, means for moving the bolt relatively to the casing members, a plate past which the bolt is adapted to project and means cooperating with the overlapping portions of the casing members connecting together the casing members and connecting the plate thereto, said last mentioned means constituting the only means connecting together the casing members.

3. A latch comprising a casing comprising identical opposed plates each having ears projecting toward the other plate, the ears of the respective plates overlapping, a bolt disposed between the plates and adapted to project from between the plates past the overlapping ears and connecting means passing through the overlapping ears to connect the plates together, said last mentioned means constituting the only means connecting the plates together.

4. A latch comprising a casing comprising opposed casing members each having a portion projecting toward the other casing member, such portions of the respective casing members overlapping, a bolt disposed between the casing members and adapted to project from between the casing members, means for moving the bolt relatively to the casing members, means cooperating with the overlapping portions of the casing members connecting together the casing members, one of said portions having a projecting part to form a spring anchor, and a spring anchored to the spring anchor and connected with the bolt to bias the bolt relatively to the casing.

5. A latch comprising a casing comprising identical opposed plates each having ears respectively at opposite edges thereof projecting toward the other plate, each ear overlapping an ear of the other plate forming a pair of overlapping ears, a bolt disposed between the plates and adapted to project from between the plates, means for moving the bolt relatively to the plates, means cooperating with the overlapping ears connecting the plates together, one only of each pair of overlapping ears having a projection forming a spring anchor, and a spring anchored to one of the spring anchors and connected with the bolt to bias the bolt relatively to the casing.

6. A latch comprising a casing comprising identical opposed casing members each having an opening therethrough to receive a portion of a bolt operating device, said opening in each of the casing members being disposed at a location removed from the center of the casing member, two bolt operating devices, one having a portion received within the opening of one of the casing members and the other having a portion received within the opening of the other of the casing members so that one of the bolt operating devices is operable from the outside of one face of the casing and the other of the bolt operating devices is operable from the outside of the other face of the casing, the casing members being disposed with their corresponding ends at opposite ends of the latch and with the respective openings in non-opposed relationship so that the respective bolt operating devices are offset from each other, and a bolt disposed between the opposed casing members and adapted to project from between the opposed casing members, each of the bolt operating devices being disposed in operative relationship with respect to the bolt to operate the bolt when that bolt operating device is operated.

7. A latch comprising a casing comprising opposed casing members each having an opening therethrough to receive a portion of a bolt operating device, two bolt operating devices, one having a portion received within the opening of one of the casing members and the other having a portion received within the opening of the other of the casing members so that one of the bolt operating devices is operable from the outside of one face of the casing and the other of the bolt operating devices is operable from the outside of the other face of the casing, the respective bolt operating devices being in non-opposed relationship to each other, and a bolt disposed between the opposed casing members and adapted to project from between the opposed casing members, the bolt having two openings therethrough from side to side with separating means therebetween, one of the bolt operating devices entering one of the openings in the bolt and the other of the bolt operating devices entering the other of the openings in the bolt, each of the bolt operating devices being disposed in operative relationship with respect to the bolt to operate the bolt when the bolt operating device is operated, the separating means having a portion cooperable with at least one of the bolt operating devices through which the bolt may be operated.

8. A latch comprising a casing comprising opposed casing members each having one opening only therethrough to receive a portion of a bolt operating device, two bolt operating devices, one having a portion received within the opening of one of the casing members and the other having a portion received within the opening of the other of the casing members so that one of the bolt operating devices is operable from the outside of one face of the casing and the other of the bolt operating devices is operable from the outside of the other face of the casing, the respective bolt operating devices being in non-opposed relationship to each other, a bolt disposed between

the opposed casing members and adapted to project from between the opposed casing members, the bolt being transversely open, the bolt operating devices passing through the bolt, and two bolt operating cams, each connected with one of the bolt operating devices at the extremity thereof remote from the casing member receiving it, each of the cams being disposed in operative relationship with respect to the bolt to operate the bolt when the bolt operating device with which the cam is connected is operated.

9. A latch comprising a casing comprising opposed casing members each having a portion projecting toward the other casing member, such portions of the respective casing members overlapping, means cooperating with the overlapping portions of the casing members connecting together the casing members, each of the casing members having therethrough a single opening only to receive a portion of a bolt operating device, two bolt operating devices, one having a portion received within the opening of one of the casing members and the other having a portion received within the opening of the other of the casing members so that one of the bolt operating devices is operable from the outside of one face of the casing and the other of the bolt operating devices is operable from the outside of the other face of the casing, the respective bolt operating devices being in non-opposed relationship to each other, and a bolt disposed between the opposed casing members and adapted to project from between the opposed casing members, the bolt being recessed, both of the bolt operating devices entering the recessed bolt, each of the bolt operating devices being disposed in operative relationship with respect to the bolt to operate the bolt when the bolt operating device is operated.

10. A latch comprising a casing comprising identical opposed plates each having an ear projecting toward the other plate, the ears of the respective plates overlapping, connecting means passing through the overlapping ears to connect the plates together, each plate having an opening therethrough to receive a portion of a bolt operating device, two bolt operating devices, one having a portion received within the opening of one of the plates and the other having a portion received within the opening of the other of the plates so that one of the bolt operating devices is operable from the outside of one face of the casing and the other of the bolt operating devices is operable from the outside of the other face of the casing, the respective bolt operating devices being in non-opposed relationship to each other, a bolt disposed between the opposed plates and adapted to project from between the opposed plates, the bolt having two openings therethrough from side to side, one of the bolt operating devices passing through one of the openings in the bolt and the other of the bolt operating devices passing through the other of the openings in the bolt, and two identical bolt operating cams, each connected with one of the bolt operating devices at the extremity thereof remote from the plate receiving it, each of the cams being disposed in operative relationship with respect to the bolt to operate the bolt when the bolt operating device with which the cam is connected is operated.

11. A latch comprising a casing and a bolt adapted to be mounted in the casing selectively for generally rectilinear or angular operative movement, the bolt having latching portions projecting in opposite directions, one of the latching portions having a hook, the bolt being reversible end-for-end in the casing, the bolt having a pivot pin receiving opening, the casing having pivot pin receiving openings respectively cooperable with the pivot pin receiving opening of the bolt when the bolt is in its respective positions in the casing for receiving a pivot pin to mount the bolt in the casing for angular movement.

12. A latch comprising a casing and a bolt adapted to be mounted in the casing selectively for generally rectilinear or angular operative movement, the bolt having latching portions projecting in opposite directions, one only of the latching portions having a hook, the bolt being reversible end-for-end in the casing, the bolt having a pin receiving opening, the casing having two pairs of pin receiving openings, one pair of such openings near one end of the casing and the other pair of such openings near the other end of the casing, one opening of each pair being adapted to be aligned with the pin receiving opening in the bolt in each position of the bolt in the casing to receive a pivot pin to mount the bolt in the casing for angular movement and one opening of each pair being adapted to receive a guide pin relatively to which the bolt is generally rectilinearly movable when not mounted for angular movement.

13. A latch comprising a casing comprising identical opposed casing members each having therethrough a single opening only to receive a portion of a bolt operating device, said opening in each of the casing members being disposed at a location removed from the center of the casing member, two bolt operating devices, one having a portion received within the opening of one of the casing members and the other having a portion received within the opening of the other of the casing members so that one of the bolt operating devices is operable from the outside of one face of the casing and the other of the bolt operating devices is operable from the outside of the other face of the casing, the casing members being disposed with the respective openings in non-opposed relationship so that the respective bolt operating devices are mounted in the casing at different locations lengthwise of the bolt, a bolt in the casing, one of the bolt operating devices having a cam disposed at one face of the bolt near one longitudinal edge of the bolt cooperable with the bolt to move the bolt and the other of the bolt operating devices having a cam disposed at the opposite face of the bolt near the other longitudinal edge of the bolt cooperable with the bolt to move the bolt, the bolt being adapted to be positioned in the casing with either face of the bolt disposed toward either face of the casing whereby the latch may be adapted for application to doors mounted to be opened in different directions, the bolt having four cam followers, one at each of said locations at each face of the bolt, said cam followers being disposed respectively near the above mentioned edges of the bolt so as to be positioned to cooperate with the respective cams so that in each of said positions of the bolt in the casing each cam is positioned to act against one of the followers to move the bolt.

14. A latch comprising a casing comprising opposed casing members each having therethrough a single opening only to receive a portion of a bolt operating device, said opening in each of the casing members being disposed at a location removed from the center of the casing member, two bolt operating devices, one having a portion received within the opening of one of the casing members and the other having a portion received within the opening of the other of the casing members so that one of the bolt operating devices is operable from the outside of one face of the casing and the other of the bolt operating devices is operable from the outside of the other face of the casing, the casing members being disposed with the respective openings in non-opposed relationship so that the respective bolt operating devices are mounted in the casing at different locations lengthwise of the bolt, a bolt in the casing, the bolt being open in the direction from one of the opposed casing members to the other thereof, each of the bolt operating devices passing through the bolt, each of the bolt operating devices having a cam disposed at the face of the bolt remote from the casing member in which that bolt operating device is mounted and near one longitudinal edge of the bolt, the respective cams being near the opposite

longitudinal edges of the bolt, the bolt being adapted to be positioned in the casing with either face of the bolt disposed toward either face of the casing whereby the latch may be adapted for application to doors mounted to be opened in different directions, the bolt having four cam followers, one at each of said locations at each face of the bolt, said cam followers being disposed respectively near the above mentioned edges of the bolt so as to be positioned to cooperate with the respective cams so that in each of said positions of the bolt in the casing each cam is positioned to act against one of the followers to move the bolt.

15. A latch comprising a casing, a bolt in the casing, two bolt operating devices mounted in the casing at different locations lengthwise of the bolt, one of said devices having a cam cooperable with the bolt to move the bolt disposed at one face of the bolt and the other of said devices having a cam cooperable with the bolt to move the bolt disposed at the opposite face of the bolt, the traces of the paths of movement of the cams in a plane parallel to the faces of the bolt overlapping, the bolt being adapted to be positioned in the casing with either face of the bolt disposed toward either face of the casing and also with either end of the bolt projecting from either end of the casing, the bolt having at each face thereof a projection which when the bolt is disposed in certain of said positions in the casing is engageable by one of the cams to move the bolt and when the bolt is disposed in other of said positions in the casing is engageable by the other of the cams to move the bolt.

16. A latch comprising a casing, a bolt in the casing, two bolt operating devices mounted in the casing at different locations lengthwise of the bolt, one of said devices having a cam disposed at one face of the bolt and the other of said devices having a cam disposed at the opposite face of the bolt, the traces of the paths of movement of the cams in a plane parallel to the faces of the bolt overlapping, the bolt being adapted to be positioned in the casing with one face of the bolt disposed toward one face of the casing and one end of the bolt projecting from one end of the casing and also with the opposite face of the bolt disposed toward said face of the casing and the opposite end of the bolt projecting from said end of the casing, and means for pivoting the bolt to the casing for swinging movement when the bolt is in either of said positions, the bolt having at each face thereof a projection which when the bolt is disposed in one of said positions in the casing is engageable by one of the cams to swing the bolt and when the bolt is disposed in the other of said positions in the casing is engageable by the other of the cams to swing the bolt.

17. A latch comprising a casing, a bolt in the casing, two bolt operating devices mounted in the casing at different locations lengthwise of the bolt, the respective bolt operating devices being connected with the casing at opposite faces thereof, each of the bolt operating devices extending through the bolt and having a cam disposed at the face of the bolt remote from the face of the casing to which that device is connected, the traces of the paths of movement of the cams in a plane parallel to the faces of the bolt overlapping, the bolt being adapted to be positioned in the casing with one face of the bolt disposed toward one face of the casing and one end of the bolt projecting from one end of the casing and also with the opposite face of the bolt disposed toward said face of the casing and the opposite end of the bolt projecting from said end of the casing, and means for pivoting the bolt to the casing for swinging movement when the bolt is in either of said positions, the bolt having at each face thereof a projection which when the bolt is disposed in one of said positions in the casing is engageable by one of the cams to swing the bolt and when the bolt is disposed in the other of said positions in the casing is engageable by the other of the cams to swing the bolt, the projections being in line with each other generally perpendicular to the faces of the bolt.

18. A latch comprising a casing, a bolt in the casing mountable therein selectively for generally rectilinear or angular movement and bolt operating means carried by the casing and engaging the bolt to operate the same, the bolt operating means being movable in one direction to operate the bolt when the bolt is mounted in the casing for generally rectilinear movement, the bolt having means positioned in the path of the bolt operating means when so movable through which the bolt is operated, the bolt operating means being movable in the other direction to operate the bolt when the bolt is mounted in the casing for angular movement, the bolt having means positioned in the path of the bolt operating means when so movable through which the bolt is operated.

19. A latch comprising a casing, a bolt in the casing mountable therein selectively for generally rectilinear or angular movement and bolt operating means carried by the casing, the bolt operating means comprising a two-armed lever one arm of which operates the bolt when the bolt is mounted in the casing for generally rectilinear movement and the other arm of which operates the bolt when the bolt is mounted in the casing for angular movement.

20. A latch comprising a casing, a bolt in the casing mountable therein selectively for generally rectilinear or angular movement and two bolt operating devices carried by the casing and extending inwardly from opposite faces thereof respectively at different locations endwise of the bolt to engage and operate the bolt, each of said devices comprising a two-armed lever one arm of which operates the bolt upon movement of the bolt operating device when the bolt is mounted in the casing for generally rectilinear movement and the other arm of which operates the bolt upon movement of the bolt operating device when the bolt is mounted in the casing for angular movement.

21. Latch operating mechanism comprising a cylinder lock case having a bore normally for receiving a lock cylinder, a hollow spindle having a handle at its outer end rotatably mounted in the bore, a lever at the inner end of the spindle and fastening means disposed within the hollow spindle fastening the lever to the inner end of the spindle.

22. Latch operating mechanism comprising a cylinder lock case having a bore normally for receiving a lock cylinder, a hollow spindle having a handle at its outer end rotatably mounted in the bore, a lever having a portion entering the inner end of the bore and a screw entering the hollow spindle from the outside fastening the lever to the spindle.

23. Latch operating mechanism comprising a cylinder lock case having a bore normally for receiving a lock cylinder, a hollow spindle having a handle at its outer end rotatably mounted in the bore, a lever having a portion entering the inner end of the bore, said portion of the lever and the hollow spindle having interfitting means whereby they may be maintained against relative rotation but permitting application of the hollow spindle to said portion in either of two selected angular positions relatively thereto and fastening means disposed within the hollow spindle fastening the lever to the inner end of the spindle.

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