Feb. 14, 1950 D. C. SMITH ET AL 2,497,329

DOOR LATCH

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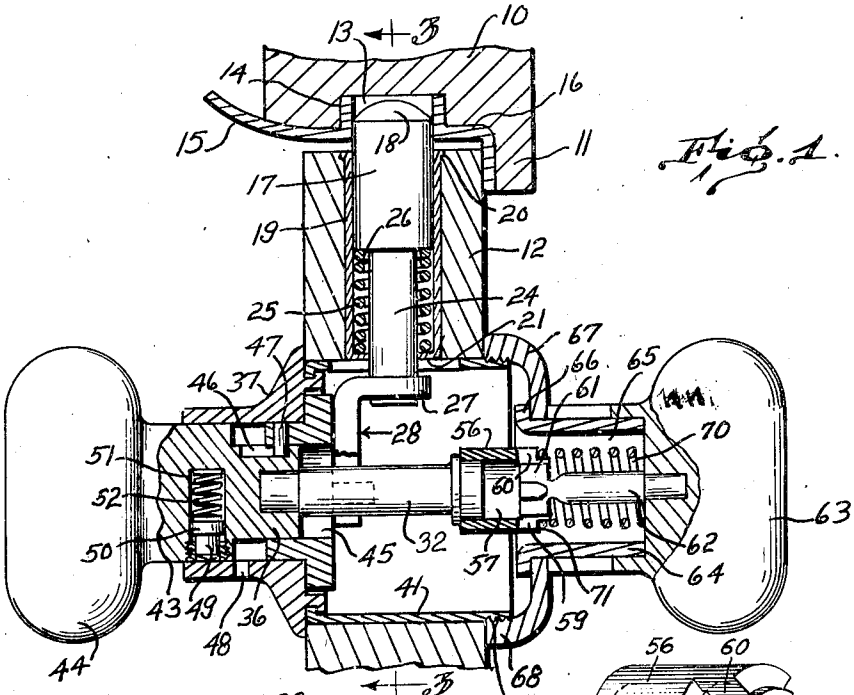


Fig. 1.

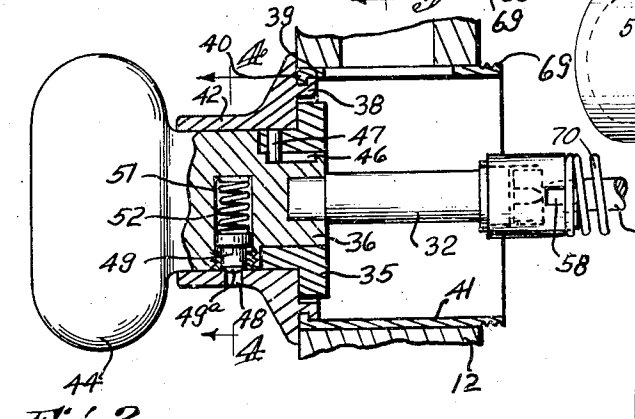


Fig. 2.

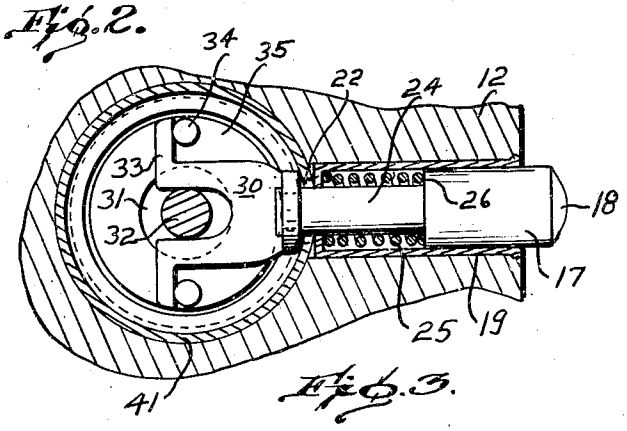


Fig. 3.

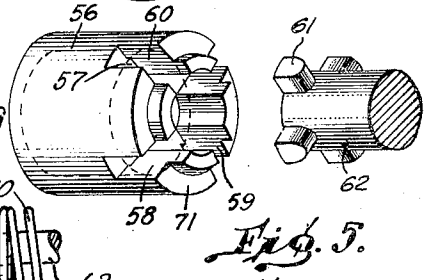


Fig. 5.

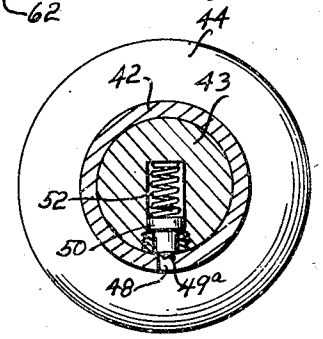


Fig. 4.

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DOOR LATCH

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6 Claims. (Cl. 292—169)

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This invention relates to door latches particularly adapted for doors wherein it is desirable to render the door selectively locked or unlocked to operation from one side without the use of keys or other separate locking means, but in response to manipulations from the other side.

An object of this invention is to produce a new and improved door latch having inside and outside handles one of which may be rendered ineffective for latch retraction purposes and is automatically rendered again effective by operation of the other handle for latch retraction purposes.

Another object of this invention is a new and improved door latch having outside and inside handles in which the outside handle is rendered automatically ineffective or effective for latch operation in response to manipulation of the inside handle for door closing or opening movements, respectively.

A further object is a door latch mechanism which is rendered ineffective or effective to latch operation from one side of the door by translatory shifting movement of a sectional shaft operatively associated with the other side of the door.

Other objects and advantages of this invention will hereinafter appear and for purposes of illustration but not of limitation an embodiment of the invention is shown in the accompanying drawings, in which

Figure 1 is an enlarged longitudinal sectional view of the latch mechanism showing the elements in operative position.

Figure 2 is a sectional fragmentary view of the latch mechanism showing one handle in the position of adjustment to render the other handle ineffective for latch operation.

Figure 3 is a sectional view of the latch mechanism taken on the line 3—3 of Figure 1.

Figure 4 is a sectional view of the latch mechanism taken on the line 4—4 of Figure 2; and

Figure 5 is an enlarged detail view in perspective of the coupling parts on the adjacent ends of the spindles.

The illustrated embodiment of the invention comprises a door frame 10 having a flange 11 extending throughout its length providing a stop for the swinging door 12. An aperture 13 in the door frame receives a sleeve 14, which, along with a curvilinear strike arm 15, forms an integral part of the keeper plate 16, amortizable in the door frame.

A cylindrical latch 17, having a rounded nose 18 is mounted in a sleeve or tubular member 19 for sliding movement into or out of engagement with the sleeve 12. The tubular member, having

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a flanged outer end 20 amortized in the door and an aperture through the closed inner end 21 is positioned in an elongate axially aligned opening 22 that intercepts an opening 23 extending transversely through the swinging door. The latch bolt is adapted to be retracted by means of a latch arm 24 of smaller diameter extending inwardly through the sleeve 19 against the forces of a coil spring 25, having one end abutting the inner closed end 21 of the tubular member 19, the other end bearing against the shoulder 26 formed between the tubular latch bolt and the latch arm.

The inner end portion of the latch arm 24 extends through and is guided by the aperture in the closed end 21 of the sleeve, and attaches to an arm 27 of an L-shaped connecting link 28 adapted to cooperate with the inside and outside handles for bolt retracting purposes.

The other perpendicularly disposed arm 30 of the link, larger in cross section, is centrally slotted as at 31 for sliding engagement with a spindle 32 extending transversely therethrough and later to be described. A yoke in the form of a pair of arms 33, extending laterally in opposite directions from the end of the link arm 30, engages a pair of lugs 34 secured to a T-shaped collar 35 operatively associated with the inner shank 36 of one of the door handles.

The T-shaped collar 35 is positioned relative to the transverse aperture extending through the swinging door by means of an escutcheon plate 37 arranged so that the outer annular edge portion engages the surface of the swinging door 12 militating against the movement thereof through the aperture 23. An annular flange 38 extending inwardly into the transverse opening has an outwardly extending annular flange 39 adapted to engage an inturned annular flange 40 formed in one end of a cylindrical frame plate in the form of a sleeve 41 that lines the transverse aperture through the door, thereby to hold the escutcheon plate in relation to the swinging door, in view of the means positioning the frame plate, as hereinafter explained.

The escutcheon plate is formed with an extending sleeve portion 42 adapted to receive the inner or larger shank 43 integral with the inside door handle 44. In the assembled relation, the T-shaped collar 35 is adapted closely to fit about the corner portion of the escutcheon plate 37 which thereby operates as a bearing enabling the collar to rotate in relation thereto and at the same time militates against the movement of the collar in a transverse direction.

The shank 36 is of a size and shape to slidingly fit in the aperture 45 through the T-shaped collar. A longitudinal groove 46 in the shank 36 receives a pin 47 depending from the collar 35 enabling the shank 36, the integrally connected shank 43 and knob 44 to be shifted axially between two positions of adjustment in relation to the collar 35, but effectively associates the collar 35 with the knob 44 so that rotational movement of one is directly imparted to the other.

An aperture 48 through the lower portion of the escutcheon plate is formed to admit a detent 49 having a rounded outer nose 49a and an enlarged inner shoulder 50, the detent being disposed in an aperture 51 formed in the shank 43. A coil spring 52 disposed between the base of the opening 51 and the shoulder 50 of the detent 47 urges the detent in an outwardly direction toward engagement of the shoulder 50 with a set screw threadedly engaged to the end portion of the opening 51, partially closing same. The integral shanks 36 and 44 are arranged so that when the handle is displaced to the inward position of axial adjustment the end of the T-shaped collar 35 is adapted to abut the shoulder formed by the integral shanks and concomitantly the detent 49 is adapted to be in registry with the opening 48 so that entrance of the rounded nose is effected, responsive to the spring forces, thus holding the handle in the forwardly displaced position of adjustment.

The spindle 32, securely connected to a central portion of the shank 36, extends transversely through the opening 23 in the swinging door 12 and is fixed at its outer end, as by threaded engagement, with one member of a coupling part comprising successive cylindrical sections 56 and 59 having cavities 57 and 58 of large and small area respectively. As illustrated by the broken lines in Figure 2, the sleeve sections thus are respectively of thin and thick wall section. Slots 60 equidistantly arranged to extend lengthwise through the outer sleeve of thick wall section permit the free passage therethrough of lugs or protrusions 61 extending radially from the end of the spindle 62 axially aligned with the spindle 32 and secured to the outside door handle 63.

When the lugs 61 are positioned in the slots 60 they are adapted to engage the side walls thereof so that the spindles 32 and 62 rotate as a unit. The projections of the lugs are so chosen that relative axial shifting movement between the sleeve 56 and the lugs, enables the lugs to be disposed within the cavity 57 in which they are free to rotate.

In the latter position of the coupling parts, turning movement of the knob 44 will be alone effective to retract the latch bolt. The handle 63 with the attached spindle 62 merely functioning as a free-wheeling unit having no effect on the latch mechanism.

A sleeve 64, disposed within an aperture 65 and adapted to abut the shank portion of the knob 63, is provided with an outwardly disposed annular flange 66 associated with the inner edge of an apertured escutcheon plate 67 having a flanged portion 68 threadably engaged to a threaded end portion 69 of the frame plate 41 extending outwardly beyond the surface of the swinging door 12.

A coil spring 70 disposed within sleeve 64, has one end bearing against the knob 63, the other end seating in an annular groove 71 formed in the periphery of the outer sleeve 59 of the coupling member connected to the spindle 55. It is manifest that the coil spring not only urges the spindle 55 and the attached handle 44 in the outwardly direction but also tensions the handle 63 and the attached sleeve 64 so that looseness and rattling noises are effectively avoided.

As previously pointed out, in the normal position of adjustment the inner handle is disposed in its outward position of adjustment, as illustrated in Figure 1, the coupling members being operatively engaged so that rotational movement of either the outside or inside handle is imparted to the collar 35, which in turn, operates through the lugs 34 to effect the retraction of the connecting link and the associated latch bolt 17 from engagement with the door frame, thereby to enable opening movements of the swinging door.

However, when the door is rocked from the inside to the closed position it is manifest that the curvilinear strike arm 15 on engagement with the rounded nose 18 of the latch bolt, causes the latch bolt to be displaced inwardly against the forces of the coil spring, the attached link merely shifting laterally in relation to the spindle 32 thereby not effecting the latch operating mechanisms. When the swinging door abuts the shoulder 11, the latch bolt is adapted to be in registry with the aperture 13 in the door frame enabling the coil spring once more to displace the latch bolt and the attached link in the outwardly, locked position.

During the final closing movements of the door, the residual pressure often exerted on the inside handle 44 effects the displacement thereof to the inner position of adjustment, previously pointed out, in which position the detent 49 engages the opening 48 militating against the retrograde movement of the handle 44. Displacement of the handle 44 in the latter position concomitantly affects the axial shifting movement of the spindle 32 and attached sleeve 59 so that the lugs 61 are positioned in the cavity 57, rendering the outer handle 63 free-wheeling and ineffective for latch retraction purposes. In the latter locked position the T-shaped collar 35 is still operatively associated with the inner handle 44 so that retraction of the latch bolt may still be effected on operation thereof.

In the latter instance when the inner knob 44 is manipulated for door opening movements, the rounded head 49a of the detent 49 operates as a wedge-like unit forcing the retraction of the detent from engagement with the aperture 48. Thus, enabling the coil spring 70 automatically to shift the spindle 32 and the attached handle 44 to the outward position of adjustment, rendering the coupling means again operable for latch retraction purposes responsive to the operation of either the inside or outside handle. It is to be understood that disengagement of the detent from the aperture may be equally effected by axial forces applied to axially displace the inside handle to the unlatched position.

In certain circumstances wherein the door latch has been accidently locked through outside operation or where it is desirable to enter the room in view of the inabilities of the person therein to effect door opening movements, precautionary measures are provided for operating the latch from the outside of the door. In this instance, attention is directed to the threaded engagement between the escutcheon plate 67 and the outwardly extending threaded portion of the frame plate 41, enabling the former to be readily disengaged, thereby enabling disassembly of the parts comprising the outer door handle. Thus,

the coupling members are exposed so that reengagement may be effected thereby to render the latch retractable by outside operation.

It is manifest that we have produced a door locking device dependent on the engagement or disengagement of telescoping spindles connected respectively to inside and outside door handles, only one of which is shiftable in response to the manipulation of the inside door handle to effect the disengagement of the coupling members, thereby to render the latch locked to outside operation. It is apparent that the door is rendered locked or open to outside operation in response to the natural movements during door opening and closing movements. In the latter instance it is understood that, when the door is closed by means of the inside handle, the final closing movements will affect the disposition of the latch elements in the position rendering the same locked to outside operations. When the inside handle is turned for latch retraction purposes the locking means are automatically urged to the position rendering the latch once more effective to outside operation. The cardinal feature of this invention lies in the simplicity of construction and operation and the relatively few parts required to obtain the beneficial results. In view of the above, a simple, durable, easily installed locking device is produced having precautionary means enabling the locked door to be unlatched from the outside when necessary.

It is manifest that the door latch described is particularly adapted to inside bedroom, bath room or other residential or office doors, but may be used with equal facility for outside residential doors, vehicle doors or the like.

Other changes may be effected in the details of construction, arrangement, operation without departing from the spirit of the invention, especially as defined in the appended claims.

What we claim is:

1. A door latch comprising inner and outer operating handles one of which is shiftable between two positions of adjustment, a pair of axially aligned spindles fixed to each of said handles respectively, a latch bolt, means for retracting the latch bolt in response to turning movement of said shiftable handle, contiguous concentric apertures of large and small diameter in the end of one spindle providing adjacent integral sleeves of thin and thick walls respectively, axial slots through the sleeve of greater wall thickness, radially extending projections on the end of the other spindle arranged to engage the slots in said slotted sleeve when the shiftable handle is in the normal position of adjustment causing the spindles to rotate together for latch retraction purposes, said projections being disengaged from said slotted sleeve when the shiftable handle is in the other position of adjustment enabling said spindles and handles to rotate independently of each other.

2. A door latch as claimed in claim 1 in which the radially extending projections are arranged to be disposed within the sleeve of thinner wall section in which they are freely rotatable when the handle is shifted to the other position of adjustment.

3. In a door latch, a pair of aligned spindles, one of which is axially shiftable between two positions of adjustment, a stationary support for said shiftable spindle, coupling means on the adjacent ends of said spindles for establishing a driving connection therebetween causing said spindles to rotate together when said shiftable spindle is axially shifted to one position of adjustment, said coupling means being rendered ineffective when said shiftable spindle is axially shifted to the other position of adjustment enabling said spindles to rotate independently of each other, spring means constantly urging said shiftable spindle toward the first position of adjustment, and a catch mechanism effective when said shiftable spindle is in the other position of adjustment for releasably holding same in said position, said catch mechanism being rendered ineffective upon turning movement of said shiftable spindle enabling said spring means to return said shiftable spindle to the first position of adjustment.

4. A door latch as claimed in claim 3, in which the catch mechanism operates releasably to position the shiftable spindle with respect to the support and comprises a stop constantly urged to extend radially from one of the above members for engagement with an opening in the other when said shiftable spindle is in the other position of adjustment enabling said spindles to rotate independently of each other, said stop being cammed out of said opening upon turning movement of said shiftable spindle enabling the spring means to become effective.

5. In a door latch, a pair of axially aligned spindles, one of which is axially shiftable between two positions of adjustment, a support for said shiftable spindle, coupling means on said spindles for establishing a driving connection therebetween causing said spindles to rotate together when said shiftable spindle is axially shifted to one position of adjustment, said coupling means being rendered ineffective when said shiftable spindle is axially shifted to the other position of adjustment enabling said spindles to rotate independently of each other, spring means constantly urging said shiftable spindle toward the first position of adjustment, and a spring-tensioned catch mechanism effective when said shiftable spindle is in the other position of adjustment for releasably holding same in said position, said catch mechanism being rendered ineffective upon turning movement of said shiftable spindle enabling said spring means to return said shiftable spindle to the first position of adjustment.

6. A door latch as claimed in claim 5, in which the coupling means comprises two relatively movable parts, one part constituting a socket member fixed to one spindle for rotation therewith and having an operating toothed mouth portion and an adjacent cavity, and the other part constituting a toothed member fixed to the other spindle, said toothed member and toothed mouth portion being engageable for conjoint rotation when the coupling parts are in one position and said toothed member lying within the cavity of the socket member to enable relative rotation of the coupling parts when the same are in the other position of adjustment.

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