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DOOR LATCH

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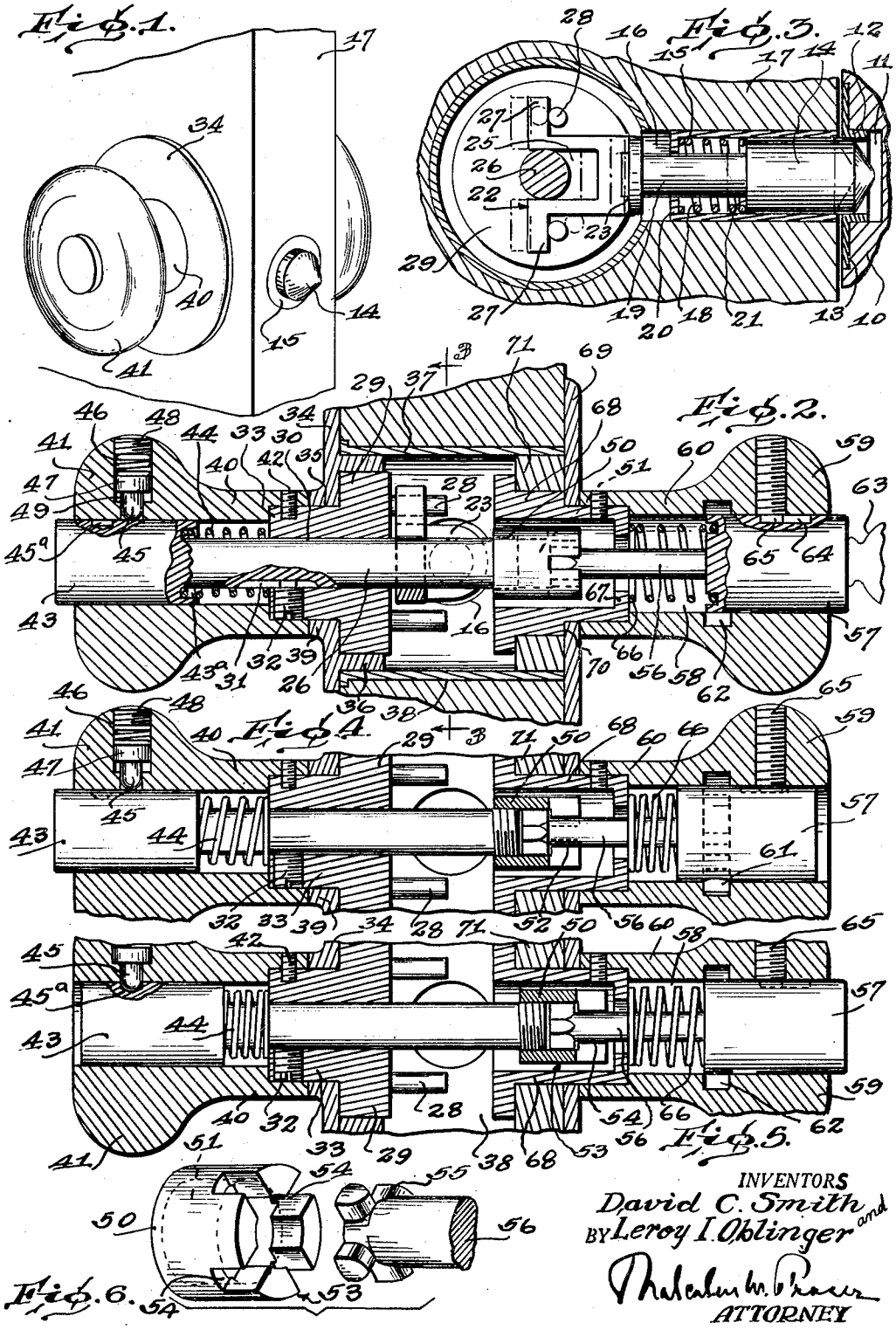

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DOOR LATCH

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This invention relates to locking devices and particularly to a door latch selectively rendered operative or inoperative in response to stem adjustments effecting the engagement or disengagement of an operating handle.

An object of this invention is to produce a door latch having inside and outside handles, the outside handle of which can be rendered ineffective to retract the latch either by manipulation of a part on the inside or outside while the door is in closed position.

Another object is to produce a door latch having inside and outside handles, the outside handle of which can be rendered ineffective for latch retraction from either the inside or outside, while the door is closed and can again be rendered effective only from the outside, such as by key operation.

A further object is to produce a door latch mechanism which may be secured against outside operation by the shifting of a sectional shaft, which may be readily effected from one side or the other of the door while it is in the closed position, subsequent operation from the outside of the door being dependent on the return of the shaft in response to key operation.

A still further object is to produce a new and improved door latch which is rendered inoperable in response to outside operation by translatory shifting movement of one or another telescoping shaft operatively connected to the door handles respectively.

Other objects and advantages of the 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 a perspective view of a fragment of a door in which a latch mechanism is installed;

Figure 2 is an enlarged longitudinal sectional view of the latching device which constitutes a part of the door handle and showing the elements in unlocked position;

Figure 3 is a sectional view of the latch mechanism on the line 3—3 of Figure 2;

Figure 4 is a sectional view similar to Figure 2 showing the elements in the locked position in response to shifting movement of the locking cylinder from the outside of the door, the latch bolt and associated parts being omitted;

Figure 5 is a sectional view similar to Figure 2 showing the elements in the locked position in response to actuation of the parts from the inside of the door, the latch bolt and associated parts being omitted; and

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Figure 6 is an enlarged perspective fragmentary view of the coupling parts.

The illustrated embodiment of the invention comprises a door frame 10 having an aperture 11 therein for the receipt of a sleeve 12 forming an integral part of a keeper plate 13, which is amortized into the door frame.

A latch bolt 14 movable into or out of the sleeve 12 is slidably mounted in an elongate sleeve or latch slide 15 disposed in an axially aligned aperture 16 in a swinging door 17. The latch bolt 14 is arranged to be retracted into the latch slide 15 against the normal pressure of a coil spring 18 by a latch arm 19 of smaller diameter and extending axially inward through the aperture 16. An apertured annular flange 20 integral with the inner end portion of the latch slide 15 provides a guide for the latch arm as well as a seat for one end of the coil spring 18, the other end bearing against the shoulder 21 formed between the latch arm and the latch bolt.

The latch bolt is retracted by a U-shaped connecting link 22 having an arm 23 transverse of the latch bolt 14 and apertured for receipt of the end portion of the latch arm to which it is securely attached. The other arm 24 of the link 22 is centrally slotted at 25 for the passage therethrough of an operating spindle 26 extending transversely through the door 17 and perpendicular to the arm 24 and the latch bolt 14. A yoke provided by a pair of flanges 27 extending outwardly from the ends of the arm 24 engages a pair of spaced lugs 28 attached to a collar 29 which is T-shaped in longitudinal section, and is operatively connected to the spindle 26.

The spindle 26, preferably circular in cross section, is shiftable axially between two positions of adjustment in relation to the collar 29, which is apertured at 30 to provide a bearing support for the spindle. A keyway 31 in the periphery of the spindle is engaged by a set screw or key 32 passing through the hub portion 33 of the collar 29, thereby enabling the spindle to be shifted longitudinally to one or the other position of adjustment in relation to the collar, but militating against relative rotational movements.

The collar 29 is positioned relative to the door 17 by an escutcheon plate 34 which is apertured at 35 to receive the hub portion 33 of the collar and having an annular flange 36 of larger diameter disposed between the collar and the inner edge portion of a cylindrical frame plate 37 which lines the aperture 38 extending transversely through the door.

An outwardly extending flange 39 integral with

the escutcheon plate abuts the inner edge of a hub 40 forming a part of the inner door knob 41 which is securely attached to the collar 29 by means of a set screw 42. The knob is centrally apertured for the receipt of a cylindrical head member 43 and part of the integral spindle 26 which is slidable longitudinally therethrough.

Normally, the cylindrical head member 43 is in the position of adjustment whereby its outer end projects beyond the knob 41 and is urged into that position by a coil spring 44 having one end bearing against the collar 29, the other end seating in a socket 43*a* formed in the cylindrical head member 43. Movement of the cylindrical head in the direction to the right of Figure 5 further tensions the coil spring and enables a spring-tensioned detent 45 to enter a notch 45*a* in the cylindrical head effectively to oppose the force of the tensioned spring, operating to return the cylindrical head to its normal extended position. The detent 45 is tensioned by a coil spring 46 disposed between the detent head 47 and a set screw 48 engaging a threaded aperture 49 in the knob 41. Manifestly, the application of forces in addition to that of the coil spring 44 is required to disengage the detent 45 from the groove 45*a* enabling the coil spring further to shift the cylindrical head to the normal extended position.

From the description, it is evident that rotational movement of the inside knob 41 in either direction will be directly transmitted to the collar 29 and rocks one or the other of the lugs 23, thereby to retract the connecting link 22, and the latch bolt. The coil spring 18 operates to return the latch bolt to the normal engaged position upon release of the knob 41.

A coupling part in the form of an enlarged cylindrical sleeve 50 fixed as by threaded engagement to the outer end of the spindle 26, has a central cylindrical cavity 51 and a contiguous concentric aperture 52 of smaller diameter forming a thicker wall portion 53. Four radially disposed, equidistantly arranged slots 54 are formed in the thicker wall portion 53 and are open at their inner ends to receive coupling lugs 55 which are integral with and project radially from the end of a spindle 56. When the lugs 55 are positioned in the slots 54, they are adapted to engage the side walls thereof so that the spindles 26 and 56 rotate as a unit. The length of the lugs 55 is so chosen that relative axial shifting movement between the sleeve 50 and the lugs, enables the lugs to extend into the cavity 51 in which they can freely rotate. In such position of the coupling parts, turning of the spindle 26 will be alone effective to retract the latch bolt.

Secured to the outer end of the spindle 56 is a key-operated cylindrical lock unit 57 slidable longitudinally in an elongate bore 58 which extends through a knob 59 and its integral hub 60. Since cylindrical lock units of this type are well-known to those skilled in the art, detail description thereof is considered unnecessary. Suffice it to say that a spring-tensioned bolt 61 normally engages in a groove 62 countersunk from the bore 58, and is retracted to a position flush with the bore upon operation of a key 63. An axially aligned keyway 64 on the periphery of the cylindrical lock unit 57 is engaged by a set screw 65 enabling the cylindrical lock and the attached spindle to be shifted axially between two positions of adjustment, but militating against their relative rotational movements.

A coil spring 66 disposed about the spindle 56 has one end bearing against the base of the cylindrical lock unit 57 and the other end abutting the apertured closing end 67 of a flanged retaining sleeve 68 disposed about the telescoped coupling parts. The sleeve 68 is secured to the knob 59 by means of a set screw. An outside escutcheon plate 69 seats between the end of the hub 60 and a shoulder 70 formed in the sleeve 68, positioning the attached elements in the door. An annular ring 71 disposed between the escutcheon plate 69, sleeve 68 and the frame plate 37, militates against shifting of the elements from the assembled position.

An important feature of the invention resides in the means of disengaging the spindle 56 from the spindle 26 to which the latch bolt is operably connected. Thus, in the disengaged position, the outer knob may be freely rotated without actuating the latch bolt until engagement is reestablished in a manner to be described.

Normally, the elements described are disposed as illustrated in Figure 2 of the drawings. Each of the spindles is disposed in its normal outwardly extended position as urged by their respective coil springs, such that the cylindrical head members project a short distance beyond the respective knob. In the normal position, the coupling lugs 55 on the outer spindle are engaged by the slotted sleeve 50 transmitting the rotational movements of one knob to rotational movements of the other. Thus, the latch bolt may be retracted in response to the actuation of either door knob.

When it is desired to lock the door from the inside, the cylindrical head 43 is depressed until the detent 45 engages the notch 45*a*, tensioning the coil spring 44, and causing the lugs 55 on the other spindle 56 to be disposed with the cavity 51, as illustrated in Figure 5. In this position, the latch bolt is still operable in response to the actuation of the inner knob 41, but not in response to the outer knob 59 because rotational movement thereof merely turns the projections 55 freely within the cavity 51. The engagement between the tensioned detent 45 in the notch 45*a* militates against the return axial movement of the spindle 26 as a result of vibrations or the like, such that the door can not accidentally be opened from the outside. In addition, observation as to whether or not the door is locked is readily made without opening the door, in view of the position of the cylindrical head within the knob 41.

When it is desired to lock the door from the outside, the cylindrical lock unit 57 is depressed until the lock bolt 61 snaps into the groove 62 at which time the coupling lugs 55 are shifted from engagement with the slots in the sleeve 50 into the cylindrical cavity 51 in which it is freely rotatable. Thus, the outer knob may be freely rotated without actuation of the spindle 26 which is operably connected to the latch bolt. Figure 4 of the drawings illustrates the position of the elements when locked against outside operation by depression of the lock unit 57.

It is manifest that engagement between the lugs 55 and the slotted sleeve 50 may again be effected by retracting the spindle 56 in relation to the spindle 26. It is to be observed from Figure 5, that the spindle 56 is in its outermost position of adjustment when the outside handle has been rendered ineffective by depression of the spindle 26 from the inside of the door. Therefore, in order to retract the spindle 56 in relation to the spindle 26, it is expedient first to shift the telescoped spindles to the position of adjustment at-

tained when the door is locked from the outside, as illustrated in Figure 4. For this purpose, the operator, manually depresses the cylindrical lock unit 57, the force transmitted through the abutting spindles 26 and 56 in combination with the force of the tensioned coil spring 44, effecting the withdrawal of the rounded detent 45 from the notch 45a, enabling both spindles to be shifted in the inward direction until the lock bolt 61 enters the notch 62. In this position, the coupling lugs 55 are still freely rotatable in the cavity 51, the outside knob 59 still being ineffective for latch bolt operation.

Retraction of the cylindrical lock unit 57 is not effected until the lock bolt 61 is withdrawn from the notch 62 in response to key operation. However, when withdrawn, the cylindrical lock unit and the attached spindle 56 are shifted axially outwardly by the tensioned coil spring 66, the spindle 26 remaining in its normal extended position in view of the force exerted by the spring 44. Thus the lugs 55 are retracted from the cavity 51 and into engagement with the slots in the sleeve 50. Not infrequently, retraction of the lugs is barred by the walls of the sleeve 53 but slight rotational movement of the outside knob 59 moves the lugs into registry with the slots 54 enabling the spindle 56 to be retracted.

Manifestly, we have produced a door latch locking device based upon the engagement or disengagement of telescoping spindles respectively connected to the inside and outside door handles, which spindles are axially shiftable between two positions of adjustment. Lugs are provided on the end of one spindle to engage slots in the other spindle when in the normal position of adjustment providing a driving connection causing the spindles to rotate together for latch operation by either door handle. However, when either spindle is axially shifted to the other position of adjustment, the coupling members are disengaged, enabling the spindles to rotate independently of each other, thus to lock the door against latch operation in response to the actuation of one of the handles.

An important feature of this invention resides in the simplicity of construction and operation and the relatively few parts required to attain the beneficial results. In view of the above, an economical, durable and easily installed locking device is produced.

It is to be understood that the door latch locking device comprising this invention is not restricted to the use with residential doors but may be readily adapted for use with vehicle doors or the like. Other changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What we claim is:

1. A door latch comprising inside and outside door handles, a pair of aligned independently axially shiftable spindles connected to said handles respectively, each of said spindles being shiftable between two positions of adjustment, a latch bolt, means for retracting the latch bolt in response to turning movement of one of the spindles, means coupling said spindles when axially shifted to one of the positions of adjustment causing said spindles to rotate together for effecting retraction of said latch bolt, said last means being rendered ineffective when either of said spindles is axially shifted to the other position of adjustment enabling said spindles to be rotated independently of each other, and means continuously urging each spindle toward the coupled position of axial adjustment.

2. A door latch as claimed in claim 1, in which the means urging the spindles toward the coupled position comprises coil springs.

3. A door latch comprising inside and outside door handles, a pair of aligned independently axially shiftable spindles connected to said handles respectively, each of said spindles being shiftable between two positions of adjustment, a latch bolt, means for retracting the latch bolt in response to turning movement of one of the spindles, means coupling said spindles when axially shifted to one of the positions of adjustment causing said spindles to rotate together for effecting retraction of said latch bolt, said last means being rendered ineffective when either of said spindles is axially shifted to the other position of adjustment enabling said spindles to be rotated independently of each other, spring means continuously urging each spindle toward the coupled position of axial adjustment, and releasable means holding said spindles in the other position of adjustment.

4. A door latch comprising inside and outside operating handles, a pair of aligned independently axially shiftable spindles connected to said handles respectively, said spindles being shiftable axially between two positions of adjustment, a latch bolt, means for retracting the latch bolt in response to the turning movement of the spindle connected to the inside handle, telescoping end portions on said spindles providing a driving connection between said spindles when in the normal position of adjustment causing said spindles to rotate together for effecting retraction of said latch bolt in response to the actuation of either operating handle, said telescoping spindles being freely rotatable independently of each other when either is shifted axially to the other position of adjustment militating against the operation of said latch bolt in response to the actuation of the outside handle, spring means urging said spindles toward the normal position of axial adjustment, and means releasably holding said spindles in the other positions of adjustment.

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

6. A door latch comprising inner and outer operating handles, a pair of aligned independently axially shiftable spindles connected to said handles respectively and shiftable between two positions of axial adjustment, a latch bolt, means for retracting the latch bolt in response to turning movement of one of said spindles, contiguous

concentric apertures of large and small diameter in the end of one spindle providing adjacent sleeves of thin and thick walls respectively, axial slots through the sleeve having the greater wall thickness, and radially extending projections on the end of the other spindle arranged to engage the slots in said slotted sleeve when the spindles are in their normal axially adjusted positions causing the spindles to rotate together for effecting retraction of the latch bolt, said projections being of a size enabling sliding movement thereof into the sleeve having the thinner wall thickness and in which they are freely rotatable, said projections being shifted axially into said latter sleeve upon axial movement of either spindle to the other positions of adjustment enabling said spindles to be rotated independently of each other.

7. A door latch as claimed in claim 6, in which the sleeve having the greater wall thickness is disposed in the end of the spindle.

8. A door latch as claimed in claim 6, in which elongate grooves in the periphery of the spindles are engageable with projections connected to the operating handle enabling longitudinal shifting movement of the spindles in relation to the handles but militating against relative rotational movements.

9. In a door latch, a pair of aligned spindles axially shiftable independently between two positions of adjustment, coupling means on the adjacent ends of said spindles causing said spindles to rotate together when axially shifted to one position of adjustment, said coupling means being rendered ineffective when either of said spindles is axially shifted to the other position of adjustment enabling said spindles to rotate independently of each other, and a spring associated with each spindle constantly urging same toward said first position of adjustment.

10. In a door latch, a pair of aligned spindles axially shiftable independently between two positions of adjustment, means coupling said spindles causing same to rotate together when axially shifted to one position of adjustment, said means being rendered ineffective when either of said spindles is axially shifted to the other position of adjustment enabling said spindles to rotate independently of each other, spring means for causing relative movement of said spindles toward said first position of adjustment, and catch mechanism releaseably holding said spindles in said other position of adjustment.

11. In a door latch, a pair of aligned spindles each being axially shiftable between two positions of adjustment, inner and outer operating handles connected to respective ends of said spindles, means coupling said spindles causing same to rotate together when axially shifted to one position of adjustment and enabling said spindles to rotate independently when either is shifted axially to its other position of adjustment, means constantly urging each of said spindles toward the coupled position of adjustment, catch mechanism associated with each spindle for releaseably holding same in the other position of adjustment, latch bolt operating means responsive to the rotational movement of one spindle, and lug operated mechanism for rendering the catch means associated with the other spindle ineffective enabling said urging means to impart shifting movement to the latter.

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