May 14, 1946. M. FALK 2,400,403

SPINDLE LOCK

Filed Jan. 25, 1944

Fig. 1.

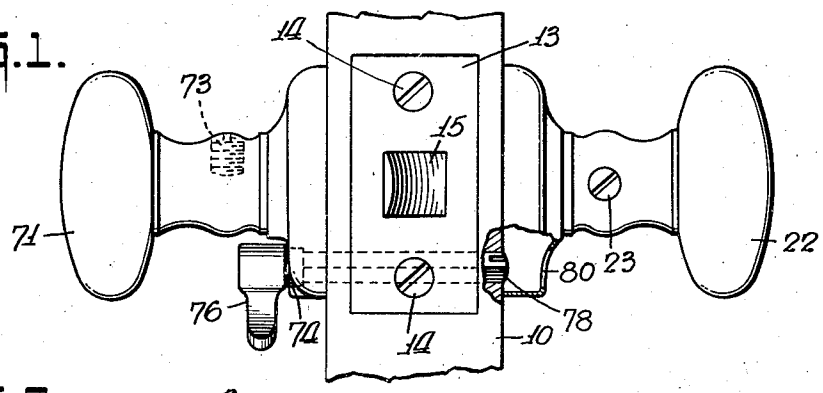


Fig. 2.

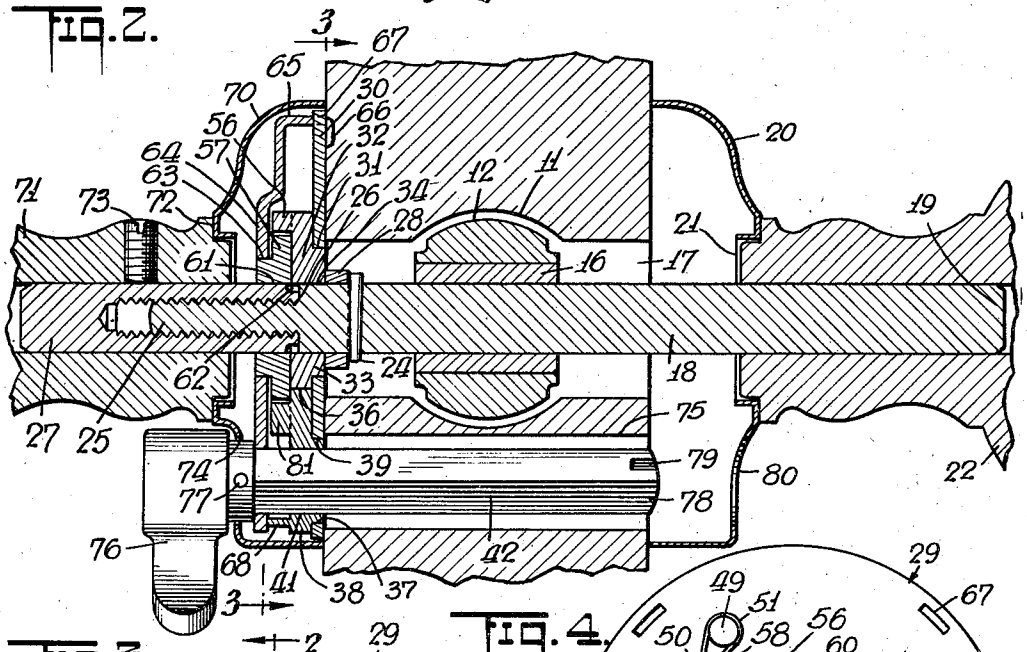


Fig. 3.

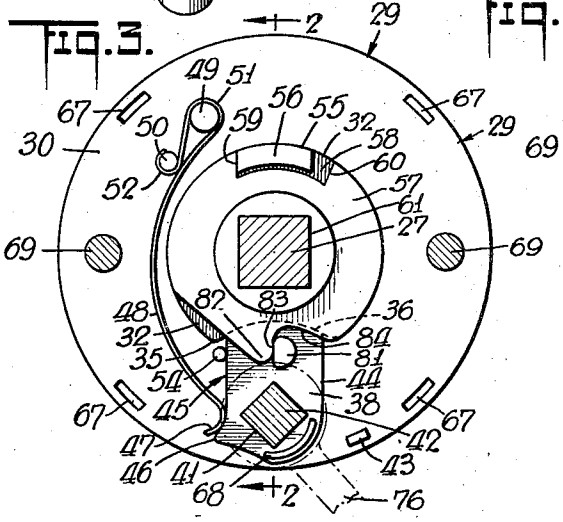
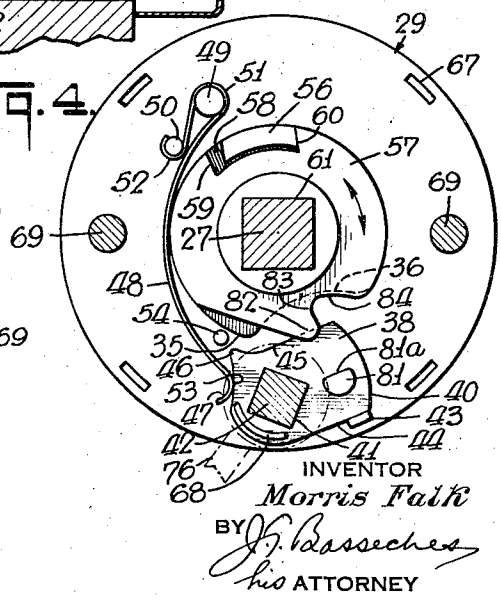


Fig. 4.



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2,400,403

SPINDLE LOCK

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Application January 25, 1944, Serial No. 519,593

15 Claims. (Cl. 292—359)

This invention relates generally to spindle locks, more particularly to spindle locks of the latch type including locking, resetting mechanism, and still more particularly to locking means for split spindles of door latches.

My invention specifically involves improvements over my Patent 2,234,912 granted March 11, 1941.

In my patent for knob spindle locks aforementioned, I have illustrated and claimed a door lock for a latch operating spindle in which the locking mechanism for the spindle comprises a rotatable member engaging a locking disc carried by the spindle for the door latch. This locking mechanism of my prior patent includes an operating spindle which is manually operated to move the locking member into locking engagement, or to move the same to a position where the spindle is released for oscillation. In my aforesaid prior patent, manual operation of the lock operating spindle to the locking position maintains the latch operating spindle against rotation by either the inside door knob or the outside door knob, and likewise requires a resetting of the lock operating spindle and the turn button controlling the same before oscillation of the inside door knob is possible.

I have found that longer life, minimum maintenance and servicing may be secured by placing reliance upon the manipulation of the inside door knob to reset the locking mechanism to the neutral position and eliminate the need for attention to the position of the locking mechanism in order to retract the latch bolt.

Accordingly, it is an object of my invention to provide a latch bolt operating mechanism including a spindle lock, and an operating mechanism which, in one position, is manually operable to lock the spindle, but which, upon oscillation of the inside door knob, serves to disengage the spindle locking mechanism.

Still further objects of my invention reside in the provision of locking means for a latch operating spindle including an assembly which may be readily mounted beneath the escutcheon or rose plate, and which includes locking means for the latch operating spindle, and resetting mechanism which upon manipulation of the inside door knob will automatically throw the locking mechanism to a spindle releasing position, eliminating the need for attention to the orientation of the locking mechanism operating spindle necessary for free oscillation of the latch operating spindle.

Still further objects of my invention reside in the provision of mechanism for releasing the locking mechanism for the latch operating spindle, which may be simply and conveniently operated during an emergency should the occasion require it, especially in connection with the split type latch operating spindle where independence of movement between the outside door knob and the inside door knob exists.

Still further objects of my invention reside in the provision of locking mechanism which is simple in construction and of economical design.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, I make reference to the accompanying drawing forming a part hereof, in which:

Figure 1 is a side elevation of my device showing the same applied to a door, with portions broken away to show details.

Figure 2 is a longitudinal section taken along the line 2—2 of Figure 3.

Figure 3 is a plan view of the locking mechanism with the parts shown in locking position, taken in the direction of lines 3—3 of Figure 2.

Figure 4 is a view corresponding to Figure 3 with the parts shown in the released position of the locking mechanism.

Making reference to the drawing, my invention is illustrated as applicable to a door lock, and, as shown, a fragment of the door 10 is provided with an edgewise boring 11 into which is disposed a latch bolt casing 12 terminating in the edge of the door in a plate 13, counter-sunk into the edge of the door and held therein by the screws 14. Through this plate the latch bolt 15 projects under spring action from within the casing 12 in a manner readily understood. The casing has its roll back sleeve 16 positioned to be aligned with a transverse boring 17 in the door leading from the front face to the rear face of the door. With the latch bolt casing thus positioned, there is then provided a knob spindle 18 which is projected in keying engagement through the roll back sleeve 16, having its outer end 19 directed through the outer rose plate 20 through the axial orifice 21 and then into the outer door knob 22 in fixed engagement with the same by the set screw 23. A cross-pin 24 is passed through the spindle 18 to limit its displacement to the outer side of the door in a manner readily understood.

The spindle 18 is of the split type and has its inner end 25 terminating in a screw-threaded section and bearing shoulder 26 to receive the inner spindle section 27 in adjustable screw-threaded engagement. The bearing shoulder 26 is adjusted in its location by the position of the outer knob 22 and the set screw 23 to locate the

same adjacent the inner face of the door, whereupon a washer 28 is sleeved over the spindle to make contact with the cross-pin 24 in the oscillating movement of the spindle 18.

With the construction thus assembled, I provide a knob spindle locking assembly 29, more specifically illustrated in Figures 3 and 4. This assembly comprises a rear plate 30 axially orificed at 31 to provide a bearing into which there is sleeved a locking disc 32, which is provided with a neck 33 entering the orifice 31 for rotatable movement. Axially the locking disc is formed with a keying orifice 34 to receive the spindle 18 in keying engagement, and is arranged to oscillate with the oscillating movement of the spindle 18 as it is moved by the outer door knob 22 in its movement to operate the roll-back sleeve 16 and retract the spring projected latch bolt 15.

The peripheral edge of the locking disc, at its lower edge 35, is formed with a concavely contoured recess 36. The plate 30 immediately below the orifice 31 is formed with a bearing orifice 37 rotatably receiving a locking plate 38 having a shoulder 39 entering the orifice 37 for rotational mounting of the locking plate 38.

The locking plate is formed with a locking edge 40 whose contour corresponds to the recess 36 formed on the locking disc. The center of curvature of the recess 36 and the locking edge is located in the axial line through the locking plate and the orifice 37 formed in the back plate 30. The locking plate is axially formed with a keying orifice 41 arranged to receive a similarly contoured locking spindle 42 for rotation therewith, in a manner which will appear more clearly as this description proceeds.

Normally the locking plate 38 may oscillate clockwise. The limiting movement in this direction is secured by the tongue 43 which is struck up from the back plate 30 and is arranged to be engaged by the side edge 44 of the locking plate. Limiting movement clockwise is effected against spring action, and for this purpose the edge 45 of the locking plate 38 terminates in a knuckle 46 extending from the edge 45 and engaging the loop 47 formed on the leaf spring 48, which is anchored by the pins 49 and 50 about which the loops 51 and 52 respectively are directed. Upon clockwise rotation of the locking plate 38, the knuckle 46 first engages the camming loop 47, displacing the same. The loop 47 then drops into a position behind the knuckle 46 to eccentrically engage the peripheral edge 53 and resiliently urge the locking plate in the position against the tonge 43, more or less to flip the locking plate into this position. Thus, the camming loop 47, the edge 53 and the knuckle 46 cooperate in the nature of a detent.

Counter-clockwise movement of the locking plate 38 with the locking disc 32, in the position as shown in Figure 3, will nest the locking edge 40 with the recess 36 to hold the locking disc against rotation, the features of which are more clearly set forth in my Patent 2,234,912 aforementioned. Counter-clockwise movement is limited by the stop pin 54, which engages the edge 45 of the locking plate 38. Here, again, in moving the locking plate in a counter-clockwise direction, the knuckle 46 contacts the camming loop 47 to engage the advance edge of the knuckle 46 and flip the locking plate into the locking position and in contact with the stop pin 54.

The upper edge 55 of the locking disc carries a coupler stud 56 extending forwardly of the face of the locking disc and is of general annular arcuate contour. The coupler stud 56 extends in the path of the coupler disc 57 and into a slot 58 between shoulders 59 and 60, which are disposed for distance slightly greater than the opposite edges of the coupler stud 56 previously mentioned. The coupler disc 57 axially is formed with a keying orifice 61, preferably square, to receive the inner spindle section 27 to one side of the bearing shoulder 26 of the outer spindle 18. The spindle section 27 is rounded adjacent the edge 62, so that the parting line between the spindle sections 27 and 18 adjacent the shoulder 26 do not interfere with each other in the separable movement of the sections 27 and 18 respectively, while permitting rotation relatively to each other of the coupler disc 57 and the locking disc 32.

The coupler disc 57 is formed with a shoulder 63 which makes bearing contact in the housing plate 64 in an orifice axially formed therein. The housing plate is formed with spacer flanges 65 which abut the front face of the back plate 30 and is locked thereto by tongues 66 passing through slits 67. The locking plate 38 is formed with a spacer tongue 68 to hold the locking plate spaced from the housing plate 64 at the lower edge of the assembly.

The construction thus far described may be positioned on the inner door surface, employing screws 69 which pass through the housing plate and the backing plate, and engage the door surface. With the assembly thus far provided, I may thereafter position an escutcheon plate 70, after which the inner door knob 71 is mounted upon a spindle section 27 and adjusted properly to bear the same against the annular bearing 72, after which the set screw 73 is driven home. The escutcheon plate 70 is orificed at 74 to receive therethrough the locking spindle 42 which extends into the boring 75. The locking spindle has mounted thereon the thumb button 76 and is held against withdrawal by the cross-pin 77. The opposite edge 78 of the locking spindle 42 terminates adjacent the outer face of the door and is formed with a keying slot 79 accessible through the orifice 80 formed in the outer escutcheon or rose plate 20.

By the construction thus far described, a knob spindle lock, embodying substantially all the features of my prior patent aforementioned, is secured in connection with a split type of knob spindle. It will be observed that from the construction described, oscillation of the outer door knob 22 will effect retraction of the latch bolt 15 through the medium of the spindle 18. Retraction of the latch bolt by the inner door knob 71 through the spindle section 27 will be effected by rotation of the coupler disc 57 in engaging the coupler stud 56 through the engagement the stud 56 makes with the slot 58 formed on the periphery of the coupler disc 57. Driving movement from the spindle 27 is transmitted to the spindle 18 after a partial counterclockwise rotation of the inner door knob spindle 27, until the shoulder 60 engages the coupler stud 56. With the locking plate in a position as shown in Figure 4, clockwise rotation of the inner door knob 71 will serve to bring into engagement the shoulder 59 with the coupler stud 56 to oscillate the spindle 18 for retraction of the latch bolt 15.

As an additional feature of my invention, I provide the locking plate 38 with a tripping pin 81 which extends in the plane of the coupler disc 57, and for this purpose I form the coupler disc 57 with a tripping finger 82 having a contacting

edge 83 defined by the peripheral cut-out 84. With the locking spindle 42 in the position as shown in Figure 4, oscillation of the locking spindle in a counter-clockwise direction will serve to permit entry of the tripping pin in the plane of the coupler disc, by reason of the cut-out 84, until the flat surface 81a of the tripping pin engages the tripping finger 82 at its contacting point 83.

With the assembly as shown in Figure 3, upon counter-clockwise rotation of the inner door knob 71, the coupler disc will first move without engaging the coupler stud 56. This movement, however, causes engagement of the tripping pin 81 by the tripping finger 82 for a distance to overcome the resistance of the camming loop 47, to flip the locking plate to the position shown in Figure 4 and disengage the locking edge 40 from the recess 36. Continued counter-clockwise movement of the inner door knob then brings into engagement the shoulder 60 with the coupler stud 56, to carry with the coupler disc 57 the locking disc 32, in turn to oscillate the spindle 18 and retract the latch bolt 15.

By the construction shown, it will be apparent that no special attention need be given to the manipulation of the turn button 76 should anyone wish to open the door from the inside face of the door, as the well-known oscillation of the door knob will serve to trip the locking plate 38 and permit free movement of the spindle sections 27 and 18. Likewise, should there be any disarrangement of the spindle sections 27 and 18 with respect to their operating knobs, actuation of the locking mechanism may be quickly effected by manipulation of the spindle 42 through the orifice 63 formed in the outer rose plate 20, using a screw driver or like keying device to engage the slit 79 formed in the edge of the spindle 42.

By the construction shown and described, it will be observed that not only have I embodied simple and economical locking mechanism, but that I have provided more or less fool-proof releasing means for the locking mechanism for the latch operating spindle, assuring longer life and simplifying maintenance and servicing of this type of construction.

It will be understood that while I have described and illustrated my invention in its preferred form, in association with the split type spindle latch operating mechanism, that I contemplate my invention as having utility with an integral latch operating spindle, and that, therefore, my invention contemplates the utilization of parts of the mechanism illustrated, and that my invention is to be judged by the scope of the appended claims.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. In a door lock comprising a latch operating spindle adapted to pass through a bore in a door manipulated by inner and outer door knobs having locking mechanism for said spindle comprising a rotatable member rotatable therewith and a rotatable element to lock said member against rotation and including means for rotating said element, the combination therewith of means actuated by said inner door knob having a lost motion movement within limits independent of latch operation by said inner knob and including means comprising an eccentric finger engaging said element to move it from locking engagement with said member upon movement of said inner knob to retract said latch.

2. In a door lock comprising a latch operating spindle made of split sections, one section of which is manipulated by an inner door knob and the other by an outer door knob, and having locking mechanism for said outer section comprising a rotatable member movable therewith and a rotatable element to lock said member against rotation including manually operable means for rotating said element to locking position, the combination therewith of means actuated by said inner door knob having a lost motion movement within limits independent of latch operation by said inner knob and including means comprising an eccentric finger engaging said element to move it from locking engagement with said member upon movement of said inner spindle to retract said latch.

3. In a door locking device for a door latch operated by an oscillating spindle employing inner and outer door knobs and having a locking device comprising a locking disc mounted on said spindle and a rotatable locking plate having inter-engaging peripheral edges, the combination therewith of means, comprising an eccentric finger, actuated by said inner knob to have a lost motion movement within limits independent of latch operation by said inner knob and to disengage said plate and said disc from each other upon oscillation of the inner knob to retract the latch.

4. In a door locking device for a door latch operated by an oscillating spindle employing inner and outer door knobs and having a locking device comprising a locking disc keyed with said spindle and formed with a concavely contoured recess and a rotatable locking plate having an eccentric portion arranged to enter the recess of said locking disc to hold said spindle locked in one position of said plate, the combination therewith of means, comprising an eccentric finger, actuated by the inner knob to have a lost motion movement within limits independent of latch operation by said inner knob and to disengage said plate and said disc from each other upon oscillation of the inner knob to retract the latch.

5. In a door locking device for a door latch operated by a sectionalized spindle including an inner knob for one section of the spindle and an outer knob for the other section of the spindle, and having a coupling between said sections whereby oscillation of the inner spindle section oscillates the outer spindle section to retract the latch, the combination therewith of manually operable rotatable locking means engaging the coupling on said outer spindle section but leaving the inner spindle section free to oscillate, and means carried by the inner spindle section engaging the locking means for the outer spindle section to rotatably disengage the locking means upon oscillation of the inner spindle section.

6. In a door locking device for a door latch operated by a spindle section operable by an outer door knob and an aligned inner spindle section relatively movable to said first spindle section, the combination therewith comprising a locking disc on said first section keyed with said first spindle section, a coupler disc on said second spindle section, and a lost motion coupler stud connecting said locking disc and coupler disc, a rotatable locking plate including manually operable means to engage said locking disc and hold said first spindle section locked against rotation, said coupler disc including means to contact a portion formed on said locking plate to disengage said locking plate upon oscillation of the second spindle section.

7. In a door locking device for a door latch operable by a spindle section controlled by an outer door knob, an axially aligned inner door knob spindle section, the combination therewith comprising a locking disc keyed to said first spindle section, a coupler disc keyed to said second spindle section, a coupler stud connecting said discs by lost motion means formed on said discs whereby rotation of the second spindle section through the said connection of said discs rotates the first spindle section, a concavely recessed peripheral portion on said locking disc, a rotatable locking plate including manually rotatable operating means therefor, arranged to engage the recess of said locking disc and hold the first spindle section against rotation, and means connecting said coupler disc and locking plate whereby oscillation of the second spindle section will disengage the locking plate from engagement with the locking disc and oscillate the first spindle section.

8. A locking device for a door latch operable by aligned sectionalized relatively movable outer and inner spindle sections, the combination comprising a backing plate adapted to be mounted beneath a rose plate associated with the inner portion of the door, a locking disc rotatably mounted on said plate including keying means for said outer spindle section, a coupler disc aligned with said locking disc including a lost motion coupler stud connecting said discs, a rotatable locking plate mounted on said backing plate including means engageable by said coupler disc to disengage the locking plate from the locking disc upon rotation of said coupler disc.

9. A locking device for a door latch operable by aligned sectionalized relatively movable outer and inner spindle sections comprising in combination a backing plate adapted to be mounted beneath a rose plate associated with the inner portion of the door, a locking disc rotatably mounted on said plate including keying means for said outer section, a coupler disc aligned with said locking disc including a lost motion coupler stud connecting said discs, a rotatable locking plate mounted on said backing plate including means engageable by said coupler disc to disengage the locking plate from the locking disc upon rotation of said coupler disc, and means on said locking plate cooperating with spring means on said backing plate to urge said locking plate into either the locking position or disengaging position upon manual rotation of said locking plate.

10. A locking device for a door latch operated by a split spindle having an inner spindle section and an outer spindle section comprising in combination a backing plate adapted to be mounted beneath a rose plate associated with said inner spindle section, a locking disc having means rotatably mounting the same on said backing plate and arranged to be mounted in keying engagement with said outer spindle section, a housing plate and means to space the same from the backing plate, a coupler disc rotatably mounted in said housing plate in axial alignment with said locking disc, a coupler stud on said locking disc disposed in a slot formed in said coupler disc, a locking plate rotatably mounted on said backing plate having a locking edge arranged to engage a concavely formed peripheral recessed portion on said locking disc including a tripping pin lying in the plane of said coupler disc, and a tripping finger formed on said coupler disc whereby oscillation of said coupler disc will disengage said locking disc and locking plate from each other.

11. A locking device for a door latch operated by a split spindle having an inner spindle section and an outer spindle section comprising in combination a backing plate adapted to be mounted beneath a rose plate associated with said inner spindle section, a locking disc having means rotatably mounting the same on said backing plate and arranged to be mounted in keying engagement with said outer spindle section, a housing plate and means to space the same from the backing plate, a coupler disc rotatably mounted in said housing plate in axial alignment with said locking disc, a coupler stud on said locking disc disposed in a slot formed in said coupler disc, a locking plate rotatably mounted on said backing plate having a locking edge arranged to engage a concavely formed peripheral recessed portion on said locking disc including a tripping pin lying in the plane of said coupler disc, and a tripping finger formed on said coupler disc whereby oscillation of said coupler disc will disengage said locking disc and locking plate from each other, and means to limit the rotative movement of said locking plate.

12. A locking device for a door latch operated by a split spindle having an inner spindle section and an outer spindle section comprising in combination a backing plate adapted to be mounted beneath a rose plate associated with said inner spindle section, a locking disc having means rotatably mounting the same on said backing plate and arranged to be mounted in keying engagement with said outer spindle section, a housing plate and means to space the same from the backing plate, a coupler disc rotatably mounted in said housing plate in axial alignment with said locking disc, a coupler stud on said locking disc disposed in a slot formed in said coupler disc, a locking plate rotatably mounted on said backing plate having a locking edge arranged to engage a concavely formed peripheral recessed portion on said locking disc including a tripping pin lying in the plane of said coupler disc, a tripping finger formed on said coupler disc whereby oscillation of said coupler disc will disengage said locking disc and locking plate from each other, means to limit the rotative movement of said locking plate, and resilient means to trip said locking plate in either of the limiting positions aforementioned upon partial movement of said locking plate.

13. A locking device for a latch operated by spindle means comprising in combination a backing plate adapted to be mounted beneath a rose plate associated with said spindle means, a locking disc and a coupler disc rotatably mounted in respect of said plate, a peripheral recessed portion on said locking disc, a plate rotatably mounted on said backing plate including an eccentrically formed locking edge arranged to engage said recessed portion of said locking disc in one position and hold said locking disc against rotation, and including a tripping pin extended into the plane of said coupler disc, a tripping finger on said coupler disc where upon oscillation of said coupler disc, said locking plate will be rotated to free the locking disc for rotation with said coupler disc.

14. A locking device for a latch operated by spindle means comprising in combination a backing plate adapted to be mounted beneath a rose plate associated with said spindle means, a locking disc and a coupler disc rotatably mounted in respect of said plate, a peripheral recessed portion on said locking disc, a plate rotatably mounted on said backing plate including an eccentric-

ally formed locking edge arranged to engage said recessed portion of said locking disc in one position and hold said locking disc against rotation, and including a tripping pin extended into the plane of said coupler disc, a tripping finger on said coupler disc where upon oscillation of said coupler disc, said locking plate will be rotated to free the locking disc for rotation with said coupler disc, said coupler disc and locking disc being connected to each other by a lost motion connection whereby the locking plate will be moved to the disengaging position upon preliminary oscillation of said coupler disc.

15. A locking device for a latch operated by spindle means comprising in combination a backing plate adapted to be mounted beneath a rose plate associated with said spindle means, a locking disc and a coupler disc rotatably mounted in respect of said plate, a peripheral recessed portion on said locking disc, a plate rotatably mounted on said backing plate including an eccentrically formed locking edge arranged to engage said recessed portion of said locking disc in one position and hold said locking disc against rotation, and including a tripping pin extended into the plane of said coupler disc, a tripping finger on said coupler disc whereupon oscillation of said coupler disc said locking plate will be rotated to free the locking disc for rotation with said coupler disc, said coupler disc and locking disc being connected to each other by a lost motion connection whereby the locking plate will be moved to the disengaging position upon preliminary oscillation of said coupler disc, and spring detent means engaging said locking plate to urge said locking plate into either of the positions aforementioned.

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