Nov. 19, 1935. R. L. BENSON 2,021,827

DOORLOCK

Filed Jan. 31, 1935 3 Sheets-Sheet 1

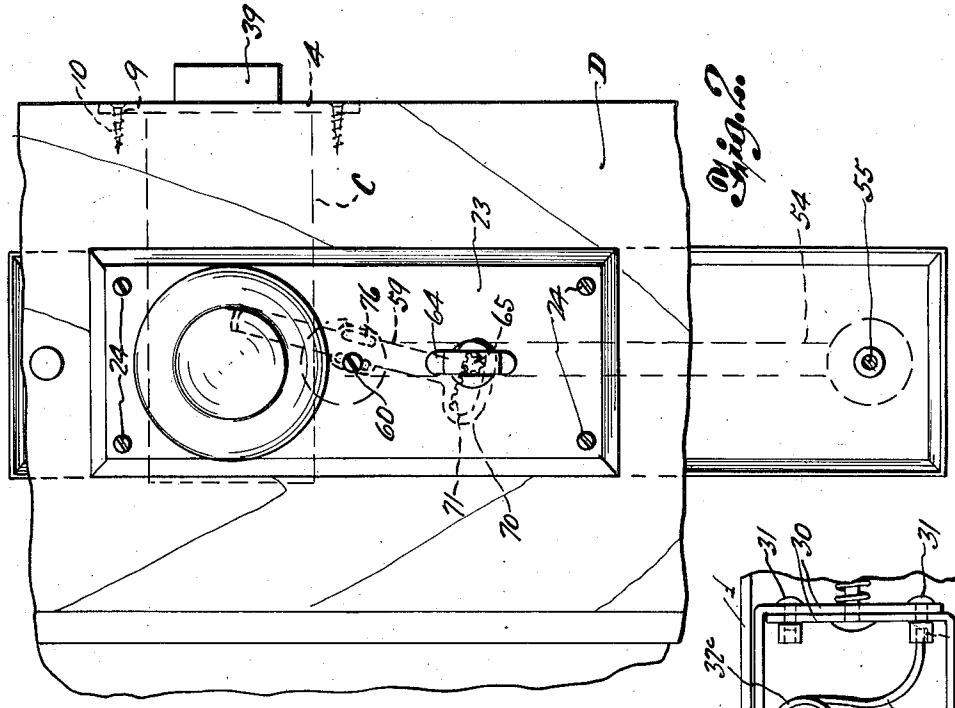


Fig. 2.

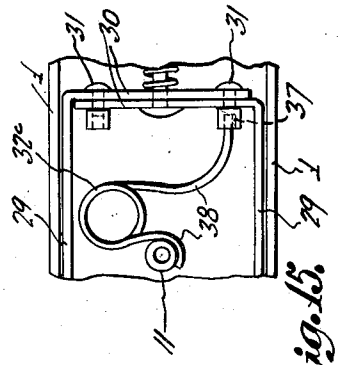


Fig. 3.

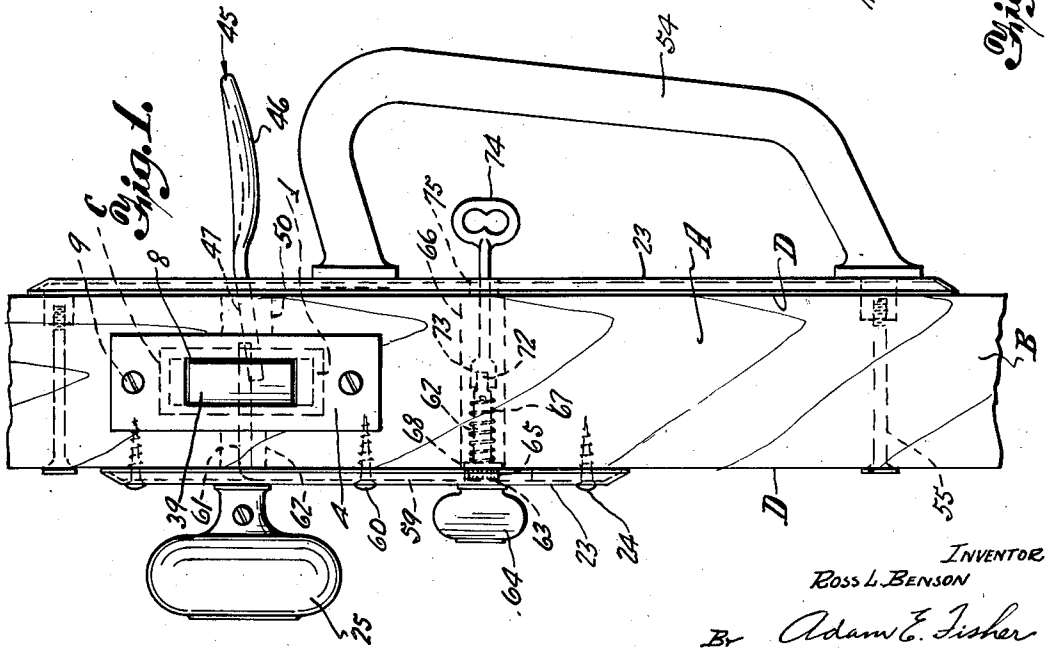


Fig. 1.

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DOORLOCK

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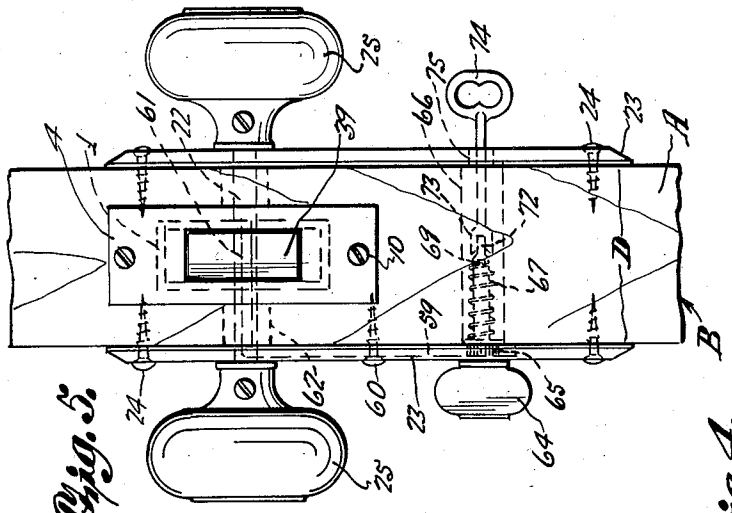


Fig. 5.

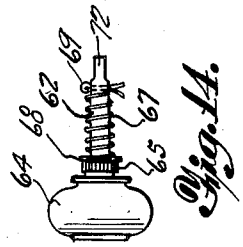


Fig. 4.

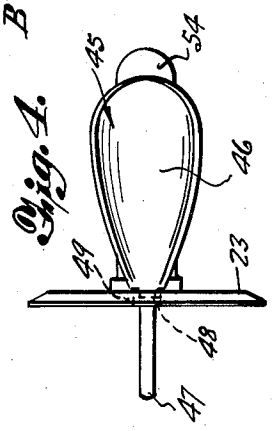


Fig. 4.

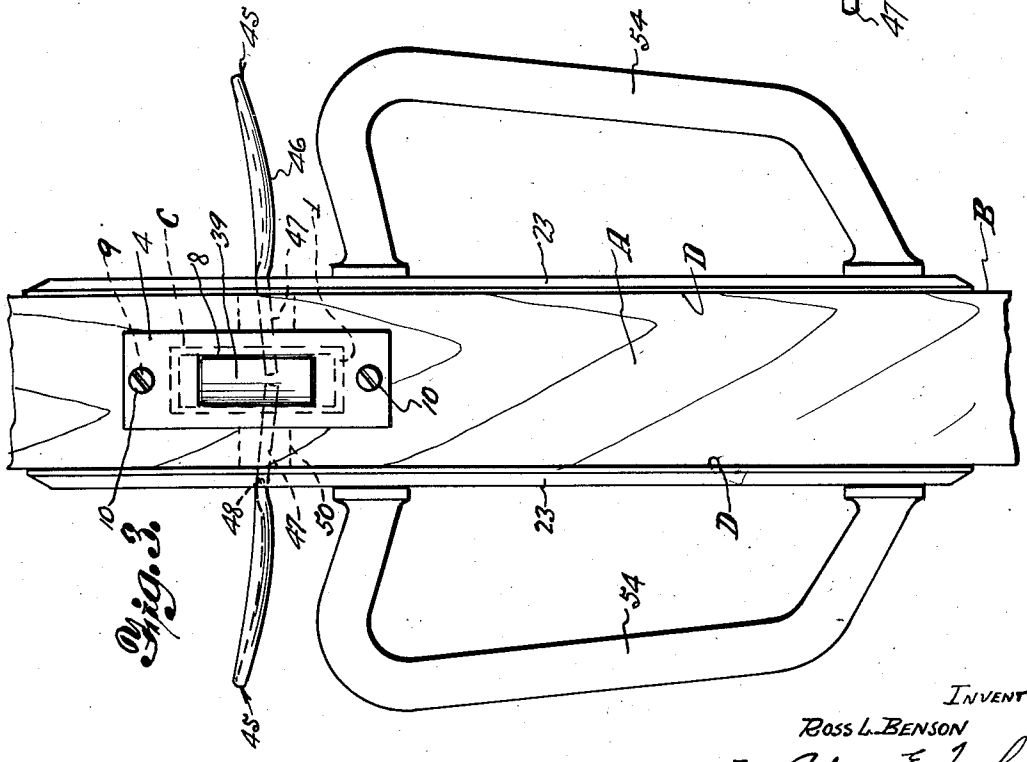


Fig. 3.

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Fig. 6.

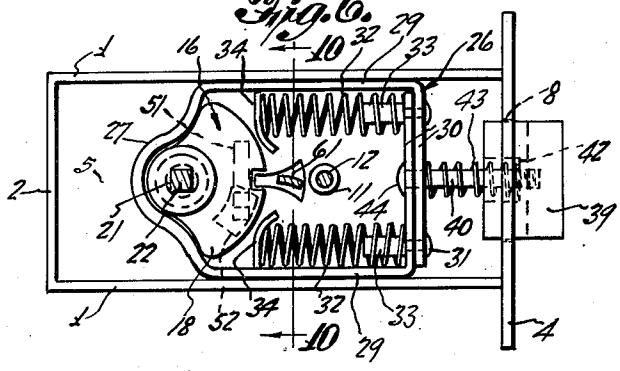


Fig. 7.

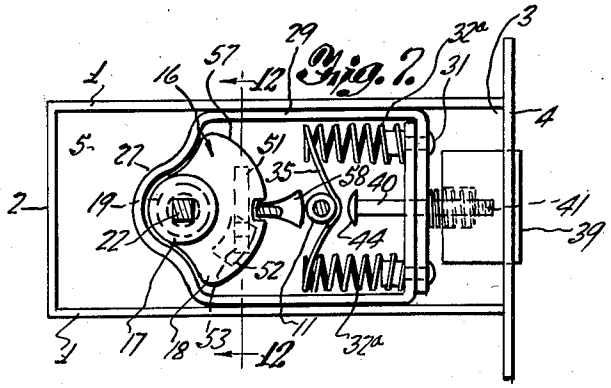


Fig. 8.

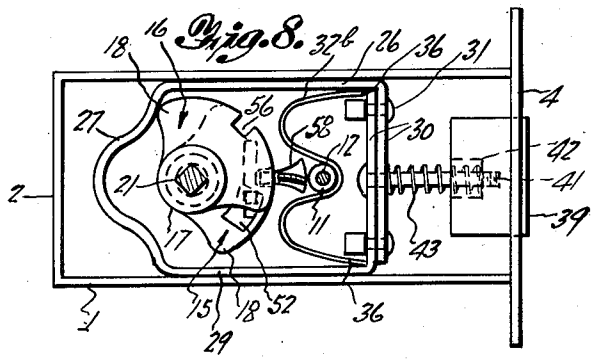


Fig. 9.

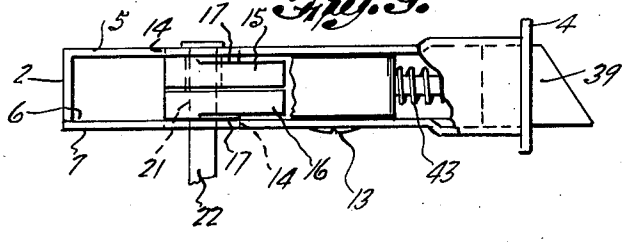


Fig. 10.

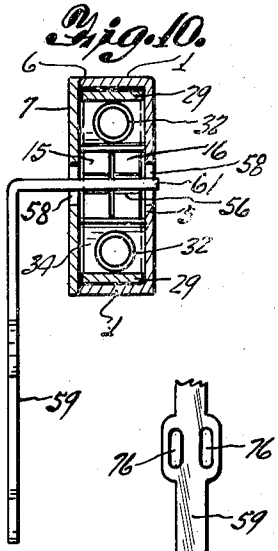


Fig. 11.

Fig. 12.

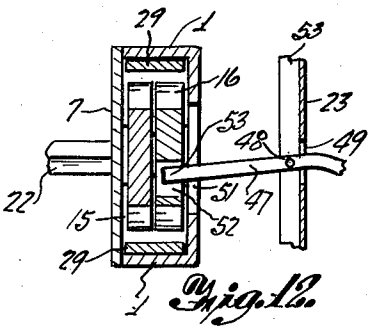
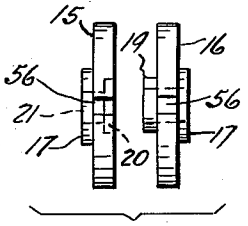


Fig. 13.



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UNITED STATES PATENT OFFICE

2,021,827

DOORLOCK

Ross L. Benson, McPherson, Kans.

Application January 31, 1935, Serial No. 4,245

7 Claims. (Cl. 70—29)

My invention relates to improvements in door locks and the main object is to provide a door lock of the flat, sliding bolt type of simple, inexpensive, durable and very compact form which may be readily and quickly installed on any door and which is suitable for not only relatively thick and heavy outside doors but for thin inside and screen doors, as well.

Another object is to provide a flat, sliding bolt lock which is as inexpensive and simple as the widely used tubular locks but which is much stronger in construction and does not require the great care and precision in installation necessary for the tubular lock.

Another object is to provide a door lock in which the operating parts are enclosed in a very thin elongated case readily mounted in even the thinnest of inside or screen doors.

A further object is to provide a lock which may be used with or without a latching mechanism which is applied exteriorly of the case and within one escutcheon or face plate and which make the lock adaptable for either outside or inside use where a night latch or inside locking means is needed. Whether used or not the latching mechanism does not interfere with the usual key operation of the lock.

Another object is to provide a lock of this kind which may be operated either with the usual knob or other rotary element or by a thumb piece or thumb latch.

With these and other objects in view the invention resides in the novel construction and arrangement of parts as hereinafter fully set forth and claimed, reference being had to the accompanying drawings wherein:

Figure 1 is an edge view of a door equipped with my lock.

Figure 2 is a fragmental inside elevation of the door and lock.

Figure 3 is a view similar to Figure 1 but showing a modified arrangement of the handles for the door and without the night latch mechanism.

Figure 4 is a plan view of one escutcheon plate of Figure 3 with the thumb piece and handle attached.

Figure 5 is a view similar to Figure 1 but showing knobs at each side for operating the lock.

Figure 6 is a side elevation of the door lock casing alone with the coverplate removed to disclose the lock mechanism within the case.

Figure 7 is a view similar to Figure 6 but showing the lock bolt pressed inward by contact with its strike plate shown in dotted lines and also showing a modified form of spring.

Figure 8 is a view similar to Figure 6 but showing the lock bolt retracted and showing still another form of spring.

Figure 9 is a top plan view of the structure shown in Figure 6 with a part of the case broken away.

Figure 10 is a cross section along the line 10—10 in Figure 6.

Figure 11 is an elevation of the lower end portion of the swing latching arm or bar.

Figure 12 is a cross section along the line 12—12 in Figure 7 showing also a fragment of the thumb piece and escutcheon plate and the engagement of the former with the lock cam.

Figure 13 is a detached and separated edge view of the lock rotor alone.

Figure 14 is a detached side view of the night latch knob, shaft and gear.

Figure 15 is a fragmental side elevation of the lock case and associated parts showing still another form of spring.

Referring now with more particularity to the drawings my lock comprises a rectangular metal case having the upper and lower walls 1, the inner closed end 2, outer open end 3 over which the face plate 4 is secured and the closed side 5 opposite an open side 6 which is normally closed by a removable cover plate 7 in usual manner. Said face plate 4 has the usual bolt aperture 8 and screw holes 9 by which the lock is screwed at 10 to the edge A of a door B with the lock case extended back into a recess C cut in the door. It will be noted that the case thus formed is of thin, elongated shape and so may be readily mounted in even the thinnest of doors.

At about the center of the lock case a stud 11 is formed on the closed side 5 and has a tapped bore 12 to receive the screw 13 for holding the cover plate 7 in place. Some distance from this stud 11 toward the inner end 12 of the case aligned openings 14 are formed in the side 5 and plate 7 and bolt operating cams 15 and 16 are journaled by their outwardly extended bearing bosses 17 in these openings 14. As shown these cams 15 and 16 are of substantially semi-circular shape with rounded corners 18 and when placed side by side just nicely fit within the lock case. One cam 15 has a pilot bearing 19 rotatably seated in a pilot recess 20 in the other whereby the two cams are arranged to rotate freely in the case either together or each independently of the other. The cams also have square or other angular registering bores 21 through their centers to receive the knob shaft 22 of corresponding section and this shaft is extended out through the sides D of

the door B through suitable escutcheon plates 23 secured by screws 24 to the door on each side. As shown in Figure 5 a knob 25 may be secured on each end of the shaft 22 whereby the cams 15 and 16 may be turned as will be understood.

A bolt operating yoke or frame 26 is mounted in the lock case and is formed of a length or strip of metal bent up into substantially rectangular shape with its bight 27 curved to fit the inner faces 28 of the cams 15 and 16 as shown and with its parallel legs 29 spaced apart so as to nicely slide within the upper and lower walls 1 of the case. The ends 30 of the strip are then overlapped and joined by rivets 31 outwardly some distance of the stud 11. Expansion coil springs 32 are set at their ends over the elongated inner heads 33 of the rivets 31 and extend inwardly within the legs 29 and are braced against spring mounting ears 34 adjacent the cams 15 and 16. The springs 32 thus serve to normally urge the yoke 26 outwardly until its bight 27 comes to rest against the cams (Figure 6). As shown in Figure 7 the springs 32*a* may be joined at their inner ends as at 35 and braced against the stud 11 as shown in Figure 8, the spring 32*b* may be of flat leaf type bowed and braced against the stud 11 and with its ends 36 placed in and braced between the rivet heads 33 and the legs 29. Or, as shown in Figure 15 a torsional wire spring coil 32*c* may be employed and its ends 38 braced between the stud 11 and one rivet head 33 which has a recess 37 to receive the spring end.

The lock bolt 39 of usual beveled shape is slidably mounted through the aperture 8 in the face plate 4 and an elongated screw 40 is slidably passed outwardly through the center of the yoke ends 30 and threaded at 41 in the inner end of the bolt 39 inwardly of a recess 42 formed therein. An expansion coil spring 43 is coiled around the screw 40 and is braced at its ends between the yoke ends 30 and the recess 42 whereby the bolt 39 is normally urged outwardly and stands projected to engage the usual strike plate (not shown) on the door casing. As the bolt strikes this strike plate it will be forced inward (Figure 7) and, the spring 43 being weaker than the springs 32, the screw 40 will simply slide inward through the yoke ends 30 without effecting or operating other parts of the lock. Considerable unnecessary wear on the parts is thus prevented. When it is desired then to release the bolt 39 from the strike plate to open the door either knob 25 is rotated turning the cams 15 and 16 and pulling the yoke 26 inward as will be evident in Figure 8. The head 44 of the screw 40 will then pull the bolt inwardly and retract it from the strike plate.

In lieu of the knobs 25 thumb levers or latches 45 may be employed to operate the lock as shown in Figure 3 or a combination of the two as shown in Figure 1. Where two thumb levers 45 are used the shaft 22 is, of course, dispensed with. These thumb levers include the outer operating ends 46 and reduced fingers 47 which are fulcrumed at 48 through holes 49 in the escutcheon plates 23 and, extending through apertures 50 in the door B, enter the lock case through vertically elongated slots 51 in the sides thereof slightly outward of the centers of the cams 15 and 16. Either one or both cams 15 and 16 then have openings 52 in which the ends 53 of the fingers 47 extend as shown. Thus by downward pressure on the outer ends 46 of the thumb levers 45 either or both cams 15 and 16 may be rotated sufficiently to draw the yoke 26 and bolt 39 inward as will be understood. Where a combination of the thumb lever and knob is used as in Figure 1 operation of the lock by the thumb lever 45 will not operate the cam actuated by the knob or vice versa, this being brought about by reaming out the bore 21 of the cam engaged by the thumb lever so that it will turn free on the knob shaft 22 as will be understood. Large handles 54 are secured by screws 55 to the door below each of the thumb levers 45 for convenience in operating the same.

The foregoing elements constitute the door latch proper and as such may be used upon any door. For most uses, however, a key lock is needed and also one with a night or thumb latch. For this purpose the cams 15 and 16 have lock notches 56 in their rounded faces 57 and the case has openings 58 in its side 5 and cover plate 7 in alignment with these notches when the cams are in normal position. The openings 58 are elongated outwardly from alignment with the notches as shown and are somewhat smaller or narrower at their inner ends than said notches. An elongated latching arm 59 is fulcrumed within one escutchean plate 23 by a screw 60 below the knob shaft 22 some distance and at its upper end terminates in a latch finger 61 turned inwardly through an opening 62 in the door B and passed loosely through the said openings 58 in the case. Thus by swinging the latching arm 59 so that the finger 61 enters the notches 56 in the cams 15 and 16 the cams are locked against rotation and the door, of course, is locked. It will be noted that the finger 61 bears at all times on the margins of the openings 58 thus relieving the finger and the notches 56 of strain.

A lock shaft 62 is journaled at 63 through the escutcheon plate 23 below the screw 60 and at its outer end has a thumb knob 64 while immediately within the plate 23*a* small spur toothed pinion 65 is keyed. An opening 66 is bored through the door B to pass the shaft 62. An expansion spring 67 is coiled around the shaft and braced against a washer 68 against the pinion 65 and at its inner end against a cotter key 69. This spring thus holds the assembly nicely in place and will retain it in any rotated position. The lower end of the latching arm 59 has an elongated arcuate loop 70 with a spur toothed rack 71 along one side placed in mesh with the pinion 65 and thus by turning the thumb knob 64 the latching arm 59 may be swung from side to side within the escutcheon plate 23 so as to enter the finger 61 in the notches 56 or to withdraw it therefrom. The thumb knob thus serves as a night latch, bathroom door latch or the like. It will be noted that the latching arm 59 is enlarged at its center point around the screw 60 and has spaced slots 76 to receive the said screw whereby the arm may be mounted at either side of the door, above or below or to one side of the lock and will function smoothly at any position.

The inner end 72 of the lock shaft 62 is of any angular or cruciform cross section so as to fit the socket 73 of its mating key 74 which is inserted through an opening 75 in the outer escutcheon plate 73 for key operation of the latching mechanism.

It will be apparent from the foregoing that I have provided an extremely simple, durable, inexpensive and adaptable lock and while I have herein set forth a certain preferred embodiment of my invention. it is understood that I

may vary from the same in minor structural details, so as best to construct a practical device for the purpose intended, not departing from the spirit of the invention and within the scope of the appended claims.

I claim:

1. In a door lock, an elongated case having an opening through one end and adapted for mounting in the edge of a door, cams journaled in the case side by side and piloted together for independent or simultaneous rotation, a rectangular yoke slidably mounted in the case and enclosing the cams whereby rotation of the same will move the yoke endwise in the case, a lock bolt slidably mounted through the end of the case remote from the cams, and spring set to normally project outwardly from the case, a screw passed slidably through the end of the yoke into the bolt, the said yoke being spring set to normally move toward the bolt, and means for rotating the cams to draw the yoke and bolt inward, the said means comprising a knob shaft extended through the cams and out through one side of the door, one of the said cams being mounted rigidly on the knob shaft and the other journaled free thereon, escutcheon plates mounted on the door, a knob on the extended end of the knob shaft, and a thumb lever fulcrumed through one escutcheon plate and engaging the free cam.

2. In a door lock, an elongated case having an opening through one end and adapted for mounting in the edge of a door, cams journaled in the case side by side and piloted together for independent or simultaneous rotation, a rectangular yoke slidably mounted in the case and enclosing the cams whereby rotation of the same will move the yoke endwise in the case, a lock bolt slidably mounted through the end of the case remote from the cams, and spring set to normally project outwardly from the case, a screw passed slidably through the end of the yoke into the bolt, the said yoke being spring set to normally move toward the bolt, and means for rotating the cams to draw the yoke and bolt inward, the said means comprising escutcheon plates mounted on the sides of the door, thumb levers fulcrumed through the escutcheon plates, fingers extended inward from the levers, the said case having slots to freely pass the fingers, and the cams having eccentrically located openings to receive the inner ends of the fingers.

3. In a door lock, an elongated case having an opening through one end and adapted for mounting in the edge of a door, cams journaled in the case side by side and piloted together for independent or simultaneous rotation, a rectangular yoke slidably mounted in the case and enclosing the cams whereby rotation of the same will move the yoke endwise in the case, a lock bolt slidably mounted through the end of the case remote from the cams, and spring set to normally project outwardly from the case, a screw passed slidably through the end of the yoke into the bolt, the said yoke being spring set to normally move toward the bolt, and means for rotating the cams to draw the yoke and bolt inward, escutcheon plates mounted on the door adjacent the lock, a latching arm fulcrumed within one escutcheon plate, a finger turned inward from the upper end of the latching arm, the said case having aligned openings through its sides to pass the said finger loosely and movably through the case adjacent the cams, and the said cams having notches to receive the said finger whereby the cams are locked against rotation.

4. In a door lock, an elongated case having an opening through one end and adapted for mounting in the edge of a door, cams journaled in the case side by side and piloted together for independent or simultaneous rotation, a rectangular yoke slidably mounted in the case and enclosing the cams whereby rotation of the same will move the yoke endwise in the case, a lock bolt slidably mounted through the end of the case remote from the cams, and spring set to normally project outwardly from the case, a screw passed slidably through the end of the yoke into the bolt, the said yoke being spring set to normally move toward the bolt, and means for rotating the cams to draw the yoke and bolt inward, escutcheon plates mounted on the door adjacent the lock, a latching arm fulcrumed within one escutcheon plate, a finger turned inward from the upper end of the latching arm, the said case having aligned openings through its sides to pass the said finger loosely and movably through the case adjacent the cams, and the said cams having notches to receive the said finger whereby the cams are locked against rotation, key operated means for swinging the latching arm to lock or unlock the cams.

5. In a door lock, an elongated case having an opening through one end and adapted for mounting in the edge of a door, cams journaled in the case side by side and piloted together for independent or simultaneous rotation, a rectangular yoke slidably mounted in the case and enclosing the cams whereby rotation of the same will move the yoke endwise in the case, a lock bolt slidably mounted through the end of the case remote from the cams, and spring set to normally project outwardly from the case, a screw passed slidably through the end of the yoke into the bolt, the said yoke being spring set to normally move toward the bolt, and means for rotating the cams to draw the yoke and bolt inward, escutcheon plates mounted on the door adjacent the lock, a latching arm fulcrumed within one escutcheon plate, a finger turned inward from the upper end of the latching arm, the said case having aligned openings through its sides to pass the said finger loosely and movably through the case adjacent the cams, and the said cams having notches to receive the said finger whereby the cams are locked against rotation, key operated means for swinging the latching arm to lock or unlock the cams, the said means comprising a shaft journaled through the escutcheon plate adjacent the lower end of the latching arm a thumb knob at the outer end of the shaft, a pinion on the shaft within the escutcheon plate, a rack on the lower end of the latching arm meshing with the pinion, the opposite escutcheon plate having an opening registering with the shaft, and adapted to receive a key to engage the inner end of the shaft and turn the same.

6. In a door lock, an elongated case having an opening in one end and aligned openings in its sides remote from that end, a pair of cams journaled side by side in the latch openings and piloted together for independent rotation, a rectangular yoke formed of a strip of material bent up to enclose the cams and including legs slidably mounted within the cases, the ends of the legs being turned inwardly in overlapping relation and spaced from the cams, springs braced against these ends to normally urge them away from the cams, a lock bolt slidably mounted through the opening in the case end, and a screw

passed slidably through the overlapping ends of the yoke and screwed in the said lock bolt.

7. In a door lock, an elongated case having an opening in one end and aligned openings in its sides remote from that end, a pair of cams journaled side by side in the latch openings and piloted together for independent rotation, a rectangular yoke formed of a strip of material bent up to enclose the cams and including legs slidably mounted within the case, the ends of the legs being turned inwardly in overlapping relation and spaced from the cams, springs braced against these ends to normally urge them away from the cams, a lock bolt slidably mounted through the opening in the case end, and a screw passed slidably through the overlapping ends of the yoke and screwed in the said lock bolt, and a spring band between the yoke and lock bolt, the latter spring being relatively weaker than the first mentioned springs, and means for rotating the said cams.

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