No. 847,883. PATENTED MAR. 19, 1907.

E. C. BELKNAP & E. H. JACKSON.

COMBINATION DOOR LATCH AND BOLT.

APPLICATION FILED MAY 1, 1906.

2 SHEETS—SHEET 1.

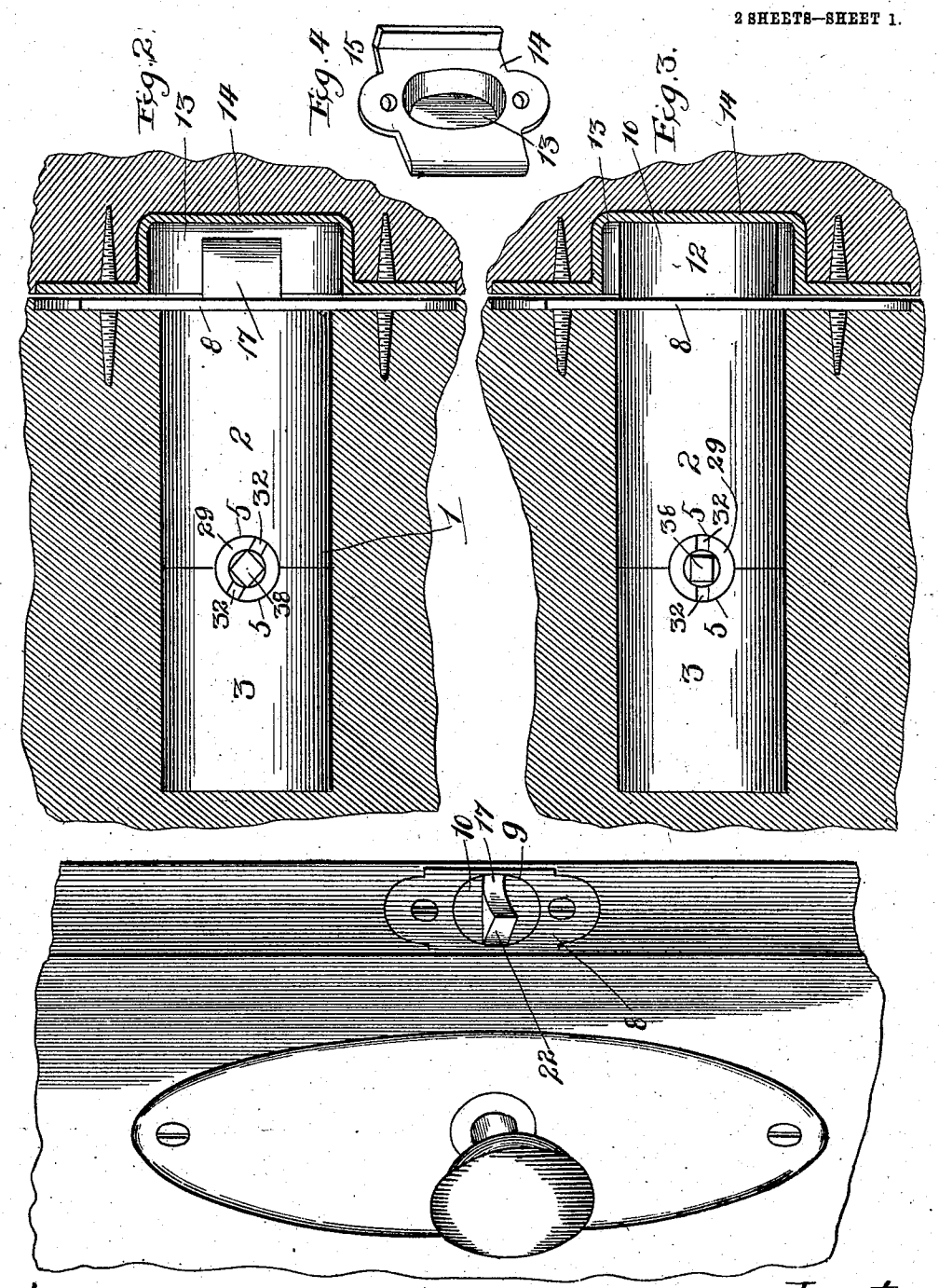

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 5.

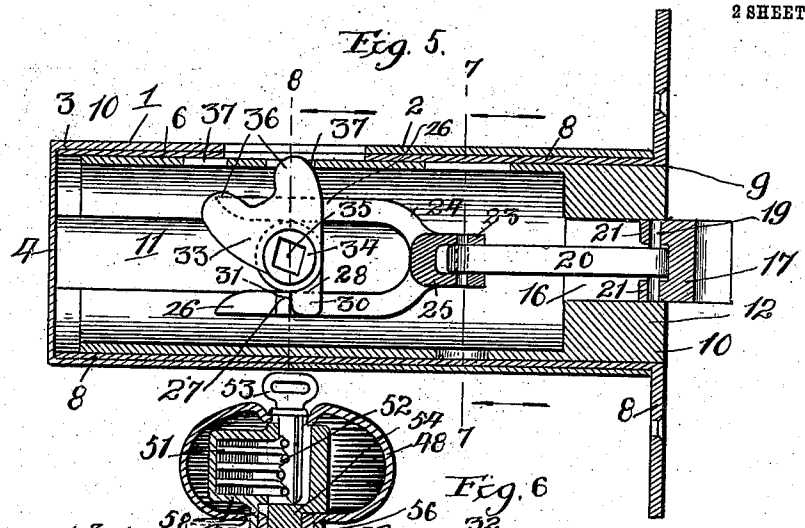


Fig. 6.

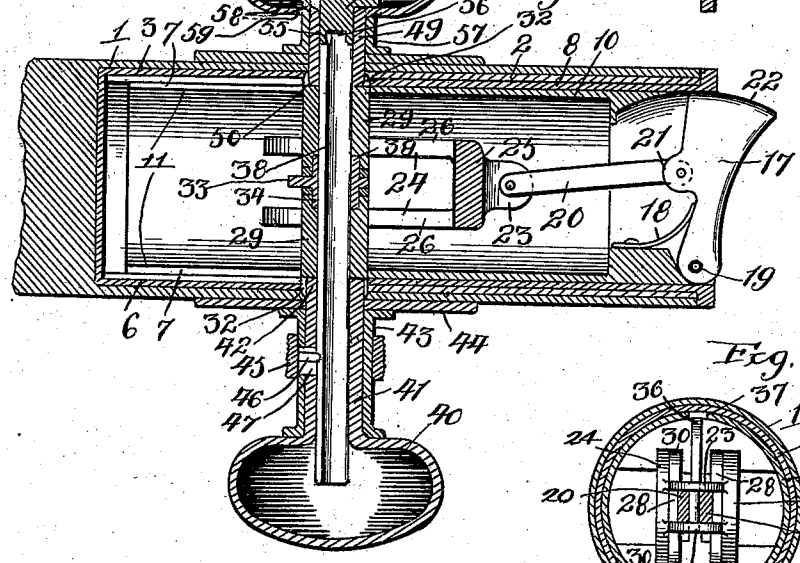


Fig. 7.

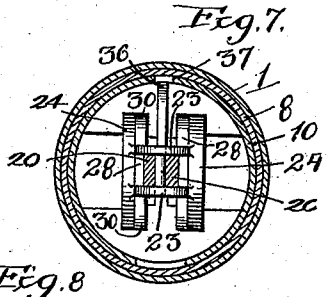


Fig. 9.

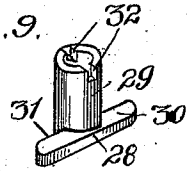
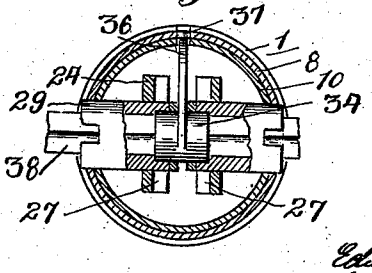


Fig. 8.



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UNITED STATES PATENT OFFICE.

EDWIN C. BELKNAP AND ERSKINE H. JACKSON, OF CHICAGO, ILLINOIS.

COMBINATION DOOR LATCH AND BOLT.

No. 847,883. Specification of Letters Patent. Patented March 19, 1907.

Application filed May 1, 1906. Serial No. 314,664.

To all whom it may concern:

Be it known that we, EDWIN C. BELKNAP and ERSKINE H. JACKSON, both citizens of the United States, and both residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Combination Door Latches and Bolts, of which the following is a specification.

The object of this invention is to combine the door latch and bolt in such a manner that there will be a great saving in the space occupied by the operating mechanism, which obviates the necessity for providing a deep or extensive cut in the door, thereby saving the labor required for inserting the lock mechanism into the door and at the same time simplifying the locking mechanism as a whole and the individual parts thereof.

Another object of the invention is to obviate the necessity for providing a keyhole in the door-lock, the hole being formed in the outer knob of the door in a position easy of access by authorized persons. At the same time the locking mechanism as a whole is so arranged that it will be impossible to manipulate the mechanism from the outside when the parts are set to one position of adjustment, which renders the lock peculiarly fitted for homes or other places in which absolute security is required against the admission of burglars or other unauthorized persons.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a perspective view showing the locking mechanism secured to a door. Fig. 2 is a sectional elevation of a door and door-casing, showing the locking mechanism in elevation with the latch thrown; Fig. 3, a similar view showing the bolt thrown; Fig. 4, a perspective view of the socket; Fig. 5, a sectional elevation showing the interior mechanism; Fig. 6, a sectional plan view showing the interior mechanism; Fig. 7, a cross-sectional view taken on line 7 7 of Fig. 5; Fig. 8, a similar view taken on line 8 8 of Fig. 5, and Fig. 9 a perspective view of the cam-lug for retracting the latch.

The working mechanism of the device is inclosed with a cylindrical casing 1, consisting of a front section 2 and a rear section 3. The rear section is provided with an end wall 4, and the sections are provided in their abutting edges with half-circular recesses 5, forming when the two parts are assembled a hole for the passage therethrough of the mechanism hereinafter described. Inside of the outer casing is an inner cylindrical casing 6, which is open at its rear end and is preferably slotted back therefrom on each side to provide cuts or recesses 7 for inserting the operative mechanism into place from the rear end of the inner casing. The slots or recesses terminate in alinement with the holes formed through the sectional outer casing, and the inner casing has secured thereto at its forward end a face-plate 8, which is embedded into the edge of the door and is provided with a hole or opening 9 for the projection therethrough of a bolt 10. The bolt is of cylindrical formation and of suitable diameter to slide easily within the inner casing and, like the inner casing, is slotted back on opposite sides to provide recesses 11, which coincide with the recesses 7 at the rear end of the inner shell. The bolt at its forward end is provided with a solid head 12, which when the bolt is thrust forward is adapted to enter a socket 13, formed in a socket-plate 14, which latter is provided with a flange 15, intended to be embedded in the door-jamb to prevent tampering with the locking mechanism.

The bolt-head has formed therein a recess 16, within which is pivoted a latch 17, which latch is normally thrust forward by means of a spring 18, the latch being pivoted at its lower end by means of a cross pivot-pin 19, which allows the latch to be retracted against the pressure of the spring until the outer face of the latch is substantially flush with the outer face or bolt. The latch is adapted to be retracted by means of a link 20, which is pivoted between ears 21 on the inner face of the latch, which ears are substantially half-way between the pivotal pin 19 and the free end 22 of the latch, which latter is preferably curved, as shown in Fig. 6. The link 20 is pivoted between ears 23, which form part of a yoke 24, having a cross-head 25 and two pairs of side arms 26, the side arms being disconnected at their rear ends. Each of the side arms has inwardly projecting therefrom a lug 27, the four lugs being in the same transverse plane, and the lugs serve as abutments for a pair of disconnected cams 28, lying within the side arms 26, as shown in Figs. 5 and 7, each of the cams being formed as shown in Fig. 9 and consisting of a hub 29,

having at its inner end a cross cam-bar 30, the inner or acting face 31 of which is in the plane of the axial center of the hub, and the hubs extend outwardly in opposite directions between the side arms 26, and each is provided in its end with recesses 32 for a purpose to be hereinafter explained.

Intermediate the two cams is a bolt-operating plate 33, which is secured to a hub 34, having in its center a square opening 35, and the plate terminates at its outer or free end in a pair of ears 36, which are adapted to engage with elongated slots 37, cut in the cylindrical body of the bolt, so that when the bolt-operating plate is turned the ears will engage with the recesses and throw the bolt forward.

Through the square hole is passed a square bolt-shank 38, which is of suitable size to rotate easily within the hubs of the latch-cams, so that the latch-cams may be turned or moved without turning the square shank, and, as shown, the inner ends of the cam-hubs are provided with bores or recesses 39, of suitable size to receive the ends of the bolt-plate hub, which arrangement permits the parts to act independently of one another, but at the same time provides a journal-mounting for each of the members and holds the parts in proper alinement.

One end of the square bolt-shank is entered into an inner knob 40, provided with a turning shank 41, having in its end lugs 42, adapted to engage with the recesses 32 in the outer end of one of the cam-hubs, so that by moving the knob the hub and cam member attached thereto will be moved thereby, bringing the cam-surface 31 to bear against one pair of lugs 27, which when pressure is brought to bear tends to move the latch-operating yoke, thereby retracting the yoke 20 and the latch operated thereby.

It will be understood that latch-cams are independently operated and that a movement of either one of them is sufficient to move the latch-yoke and retract the latch.

Surrounding the inner knob-shank 41 is a sleeve or collar 43, which is rigidly secured to a door-plate 44, of the usual character, and serves as a bearing for the door-knob shank, and encircling the sleeve is a bolt-operating ring 45, which is preferably milled to permit its manipulation, which ring is connected with the square bolt-shank by means of a pin 46, which passes through a circumferential slot 47 in the knob-shank and sleeve, which slot is of sufficient size to permit the square shank to be turned sufficiently to throw the bolt and likewise to be retracted, for a purpose which will hereinafter appear.

The outside of the door is provided with an outer knob 48, which contains suitable locking mechanism, which mechanism is only adapted to be operated when a proper key is inserted into the lock mechanism. The outer knob 48 is provided with a knob-shank 49, having ears or lugs 50, which engage the upper cam-hub in exactly the same manner that the inner cam-hub is engaged, so that when the outer knob is turned the latch can be retracted and the door opened. As shown, the knob has therein a suitable tumbler mechanism, preferably the style known as the "Yale" lock, which serves the purpose of illustration, which mechanism in a general way consists of fixedly-mounted tumblers 51 and rotatably-mounted tumblers 52, the latter of which are engaged by a key 53, which moves the tumblers into suitable position to permit the rotation of the frame 54, within which the movable tumblers are located. The frame 54 has at its inner end a socket 55, into which is entered the end 56 of the bolt-shank, so that when the bolt-shank is projected into the socket in the tumbler-frame and the key is entered into the lock the bolt can be retracted by the movement of the key. The fixedly-mounted tumbler-frame is rigidly secured to an outer sleeve 57 by means of a neck 58, which, as shown, passes through a slot 59 in the knob, which arrangement permits the knob to be turned a sufficient distance without moving the fixedly-mounted tumblers.

In use when it is desired to throw the bolt from the inside the ring 45 is thrown back toward the knob sufficiently to disengage the end of the bolt-shank 38 from the movable tumbler-frame, after which the ring is turned, which turns the square shank and with it the bolt-plate having thereon the ears. This turning causes the ears to engage with the slots in the bolt, throwing forward the bolt, without, however, moving the latch-operating yoke, which maintains its same relative position. This causes the bolt to move forward until the latch is housed, after which the bolting operation is complete. It will be noted that when the bolt is thrown in this manner the bolt-shank is entirely disengaged from the locking mechanism, so that it will be impossible, even if an unauthorized person had a key, to open the door, since the turning of the key would not serve to actuate the bolt mechanism at all. In order to unlock the bolt from the outside, it is necessary that the bolt-shank be moved forward sufficiently to engage with the movable tumbler-frame, after which the movable frame and the bolt-shank can be turned by a key having the proper configuration to move the tumblers. The arrangement as a whole is one which is very saving of space, since the entire operating mechanism is located with the bolt itself, and the locking mechanism is housed entirely within the outer knob. When inserting the mechanism as a whole into a door, it is only necessary to drill a hole in the edge of the door of sufficient depth to house the mechanism, and this hole may be

drilled without breaking through the face of the door, which minimizes the amount of wood necessary to be removed and the amount of labor necessary to be expended in fitting the parts into place. It will be understood that the particular locking mechanism herein shown and described serves for purposes of illustration only, and that other mechanism of a different style might be employed for performing the same result.

The principal feature of the invention is the movable bolt having housed therein the latch and the mechanism for operating the parts and, furthermore, that the parts are interchangeable and adapted to be used upon both right and left hand doors, a feature of considerable importance in the art to which this invention relates.

What we regard as new, and desire to secure by Letters Patent, is—

1. In a device of the class described, the combination of a bolt, a beveled latch surrounded on all sides by and normally projecting outwardly from the end of the bolt, mechanism located immediately behind and in line with the head end of the bolt for moving the latch, and mechanism for moving the bolt, substantially as described.

2. In a device of the class described, the combination of a bolt, a latch normally projecting outwardly from the end of the bolt, a pair of knobs, knob-actuating mechanism located immediately behind and in line with the head end of the bolt for moving the latch, mechanism similarly located for moving the bolt, and a key-actuated shaft in line with the axes of the knobs for operating the last-named mechanism, substantially as described.

3. In a device of the class described, the combination of a bolt, a latch adapted to be outwardly projected from the end of the bolt, mechanism contained within the bolt for operating the latch, a knob engaging with the latch-actuating mechanism, and means for operating the bolt, substantially as described.

4. In a device of the class described, the combination of a bolt, a latch adapted to be outwardly projected from the end of the bolt, mechanism contained within the bolt for operating the latch, a knob engaging with the latch-actuating mechanism, and means for operating the bolt independently of the latch-operating mechanism, substantially as described.

5. In a device of the class described, the combination of a bolt, a latch adapted to be outwardly projected from the end of the bolt, mechanism contained within the bolt for operating the latch, a knob engaging with the latch-actuating mechanism, and a lock contained within the knob for moving the bolt-operating mechanism, substantially as described.

6. In a device of the class described, the combination of a bolt, a latch adapted to be outwardly projected from the bolt, means contained within the bolt for moving the latch, a bolt-operating mechanism, a transversely-extending shank upon which the bolt-operating mechanism is mounted, knobs surrounding the outwardly-projecting ends of the shank and provided with knob-shanks engaged with the latch-operating mechanism, a lock mechanism contained within one of the knobs and normally engaged with the bolt-shank, and means independent of the locking mechanism for turning the bolt-shank and disengaging the bolt-shank from the locking mechanism, substantially as described.

7. In a device of the class described, the combination of a bolt, a latch mounted therein normally projecting outwardly from the end of the bolt, a spring for holding the latch in outwardly-projected position, a movable yoke located immediately behind the head end of the bolt and connected with the latch, a pair of independently-movable cams similarly located, either of which is adapted to actuate the yoke, inner and outer knobs, one connected with each of the cams and adapted to actuate the same, mechanism located immediately behind the head end of the bolt for moving the bolt and a key-operated shaft in line with the axes of the knobs for operating the last-named mechanism, substantially as described.

8. In a device of the class described, the combination of a bolt, a latch normally projecting outwardly from the end of the bolt, a spring for holding the bolt in outwardly-projected position, a movable yoke connected with the latch, a pair of independently-movable cams, either of which is adapted to actuate the yoke, inner and outer knobs, one connected with each of the cams and adapted to actuate the same, mechanism contained within the bolt for moving the same, a bolt-shaft in line with the axes of the knobs and adapted to operate the bolt mechanism and a lock within one of the knobs for actuating the bolt-shaft, substantially as described.

9. In a device of the class described, the combination of a bolt, a latch normally projecting outwardly from the end of the bolt, a spring for holding the latch in outwardly-projected position, a movable yoke connected with the latch, a pair of independently-movable cams, either of which is adapted to actuate the yoke, inner and outer knobs, one connected with each of the cams and adapted to actuate the same, mechanism contained within the bolt for moving the same, a transversely-extending bolt-shank upon which the bolt-actuating mechanism is mounted, a lock contained within one of the knobs and adapted to move the shank, and means independ-

ent of the lock combined with the other knob for moving the shank, substantially as described.

10. In a device of the class described, the combination of a cylindrical casing, a cylindrical bolt movable within the casing, a beveled latch surrounded by and normally outwardly projecting from the bolt, a spring for holding the latch in normally projected position, a longitudinally-movable yoke connected with the latch, a pair of knobs, means for imparting a longitudinal movement to the yoke by the turning of either of the knobs, and independent mechanism for moving the bolt, substantially as described.

11. In a device of the class described, the combination of a bolt, a latch normally projecting outwardly from the bolt, a spring for holding the latch in normally projected position, a longitudinally-movable yoke connected with the latch, a pair of knobs, means for imparting a longitudinal movement to the yoke by the turning of either of the knobs, mechanism for moving the bolt, a lock contained within one of the knobs for actuating the bolt-moving mechanism, and means combined with the other knob for disengaging the bolt-actuating mechanism from the lock and for actuating the bolt mechanism, substantially as described.

12. In a device of the class described, the combination of a casing adapted to be secured within a door, a bolt slidably mounted within the casing, a latch pivoted within the end of the bolt, a spring for normally projecting the latch outwardly, a longitudinally-movable yoke, a connection between the yoke and the latch, lugs or abutments on the yoke, independently-movable cams bearing against the lugs or abutments and adapted to retract the yoke, a transversely-extending bolt-shank, a bolt-actuating plate mounted upon the shank and provided with ears adapted to engage with the wall of the bolt for moving the same, inner and outer knobs provided with shanks engaging with the latch-actuating cams, locking mechanism contained within one of the knobs for turning the bolt-shank, and means combined with the other knob for disengaging the shank from the locking mechanism and independently turning the shank, substantially as described.

13. In a device of the class described, the combination of a symmetrical cylindrical casing adapted to be mounted either side up within a door, a cylindrical bolt slidably mounted within the casing, a latch movably mounted within the end of the bolt, mechanism contained within the casing and immediately behind and in line with the head of the bolt for moving the latch, inner and outer knobs adapted to be connected with either side of the casing and engage with the latch-actuating mechanism, either being adapted to actuate the latch mechanism, and independent mechanism for moving the bolt, located within the casing and immediately behind and in line with the head of the bolt, substantially as described.

14. In a device of the class described, the combination of a symmetrical casing adapted to be mounted either side up within a door, a bolt slidably mounted within the casing, a latch movably mounted within the end of the bolt, mechanism contained within the casing and immediately behind and in line with the head of the bolt for moving the latch, inner and outer knobs adapted to be connected with either side of the casing and engage with the latch-actuating mechanism, either being adapted to actuate the latch mechanism, a bolt-shaft extending transversely in the axial line of the knobs, means for turning the shaft, and mechanism actuated by the turning of the shaft for moving the bolt, said mechanism being located within the casing immediately behind and in line with the head of the bolt, substantially as described.

15. In a mechanism of the class described, the combination of a frame comprising a symmetrically-formed cylindrical tenon portion and a face-plate formed integrally therewith, a cylindrical bolt slidably mounted within the tenon portion and comprising a head having therein a recess and a hollow body portion, a latch mounted within the recess normally projecting outwardly therefrom, inner and outer door-knobs, mechanism entirely within the tenon portion of the casing and actuated by either of the door-knobs for retracting the latch, and mechanism for projecting the bolt, substantially as described.

16. In a mechanism of the class described, the combination of a frame comprising a symmetrical tenon portion adapted to be inserted either side up and a face-plate secured to the tenon portion, a bolt slidably mounted within the tenon portion and comprising a head having therein a recess and a hollow body portion, a latch mounted within the recess and normally projected outwardly therefrom, inner and outer door-knobs, mechanism within the body of the bolt and actuated by either of the door-knobs for retracting the latch, a key-cylinder in one of the knobs, a bolt-actuating shaft in engagement with the key-cylinder, and means actuated by the turning of the shaft for moving the bolt, substantially as described.

17. In a mechanism of the class described, the combination of a frame comprising a symmetrical tenon portion adapted to be inserted into a door either side up and a face-plate secured to the tenon portion, a bolt slidably mounted within the tenon portion and comprising a head having therein a recess, a latch mounted within the recess and

normally projecting outwardly therefrom, inner and outer door-knobs, mechanism within the body of the bolt and actuated by either of the door-knobs for retracting the latch, a key-lock in one of the knobs, a bolt-shaft normally in engagement with the key-lock and adapted to be retracted out of engagement therefrom, and means within the body of the bolt actuated by the bolt-shaft for moving the bolt, substantially as described.

18. In a device of the class described, the combination of a lock-casing of cylindrical formation terminating at its outer end in a face-plate, a bolt of cylindrical formation slidably mounted within the casing, inner and outer knobs extending outwardly from the casing, a bolt-shaft, a key-lock in one of the knobs adapted to actuate the bolt-shaft, and mechanism carried by the bolt-shaft for actuating the bolt, substantially as described.

19. The combination of a cylindrical casing terminating at its forward end in a vertically-elongated face-plate, a cylindrical bolt slidable within the casing, a latch normally projecting outwardly from the bolt, inner and outer knobs extending transversely of the casing, mechanism contained within the casing and in engagement with the knobs for actuating the latch by either knob, a bolt-shaft in alinement with the axes of the knobs, a key-lock in one of the knobs for turning the bolt-shaft, a bolt-actuating mechanism contained within the casing and adapted to be operated by means of the bolt-shaft, substantially as described.

20. In a device of the class described, a casing consisting of a cylindrical tenon portion and a face-plate, a cylindrical bolt slidably mounted within the tenon portion, knobs entered through the casing, bolt-actuating mechanism contained within the casing, and an outer protective casing of cylindrical formation closed at its inner end and adapted to render the mechanism substantially dust-proof, substantially as described.

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