I. GREENFIELD.

LOCKING AND LATCHING MECHANISM.

APPLICATION FILED MAY 18, 1918.

1,275,246.

Patented Aug. 13, 1918.

2 SHEETS—SHEET 1.

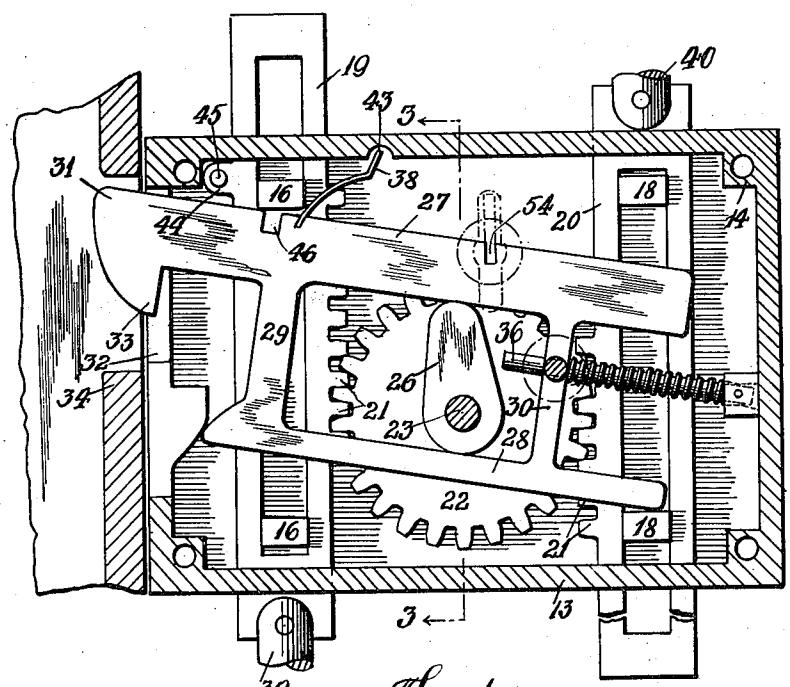


Fig. 1.

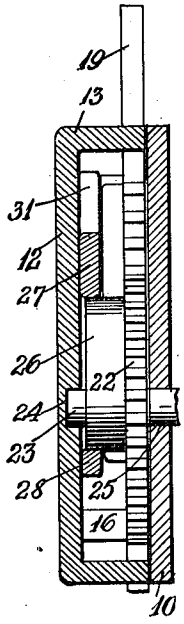


Fig. 3.

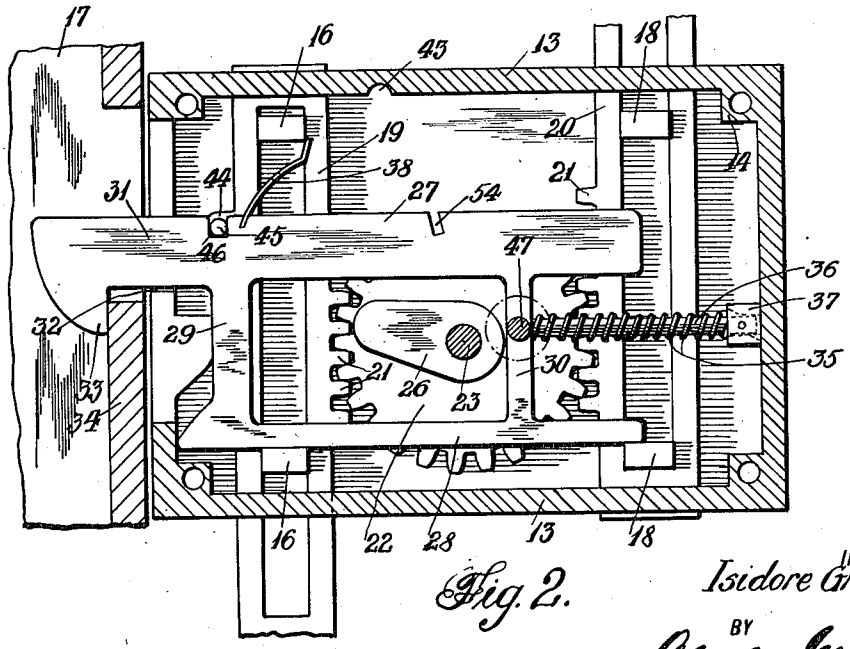


Fig. 2.

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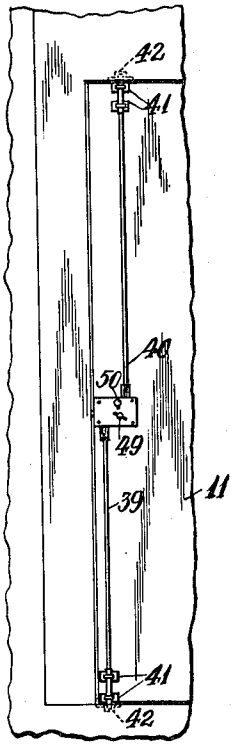


Fig. 4.

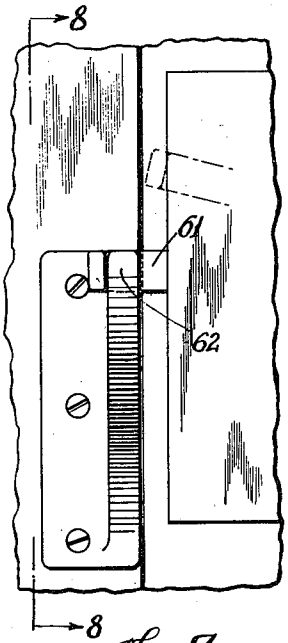


Fig. 7.

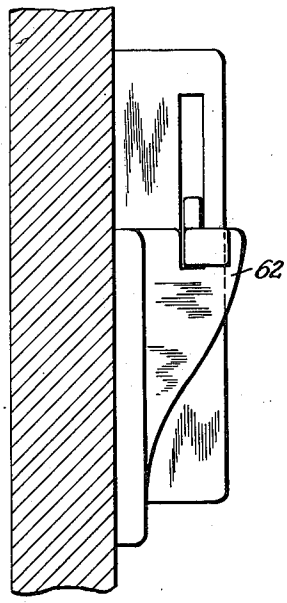


Fig. 8.

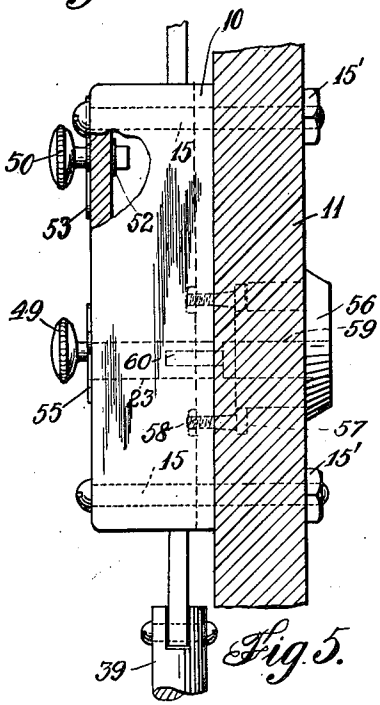


Fig. 5.

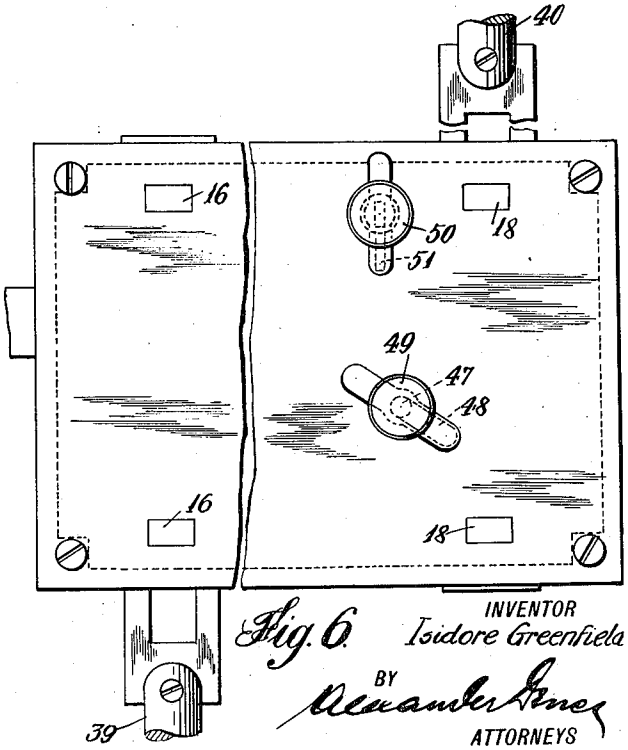


Fig. 6.

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UNITED STATES PATENT OFFICE.

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LOCKING AND LATCHING MECHANISM.

1,275,246. Specification of Letters Patent. Patented Aug. 13, 1918.

Application filed May 18, 1918. Serial No. 235,346.

To all whom it may concern:

Be it known that I, ISIDORE GREENFIELD, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Locking and Latching Mechanism, of which the following is a specification.

This invention relates to locking and latching mechanism, and a principal object of the invention is to provide a novel and efficient locking and latching mechanism which is designed particularly for use in connection with sliding doors such as are usually employed to inclose elevator shafts at the floor landings, such as are used for warehouses, railway cars and in other analogous capacities, but which in addition is also capable of being used in connection with swinging doors if desired.

Another object of the invention is the provision of a key-operated locking and latching mechanism of this character having sliding bolts arranged to be actuated in opposite directions as means through which to lock the door from opposite sides, and also having a latch bolt working across the sliding bolts and arranged to be extended and automatically locked or unlocked accordingly as the said sliding bolts are moved into locked or unlocked position.

Another object of the invention is the provision of a lock of this character which is key-operated from one side only so that when applied, for instance, to the doors guarding elevator shafts, the lock can only be operated from the inside of the shaft so as to safeguard against picking or tampering with the lock from the outside.

With the foregoing and other objects in view, the invention resides in the details of construction and in the arrangement and combination of parts hereinafter described, defined in the claims, and shown in the accompanying drawings forming a part of this specification; it being understood that changes and alterations in the precise embodiment of the invention herein shown may be made, to which changes and alterations the inventor is entitled, provided the same are effected in the scope of the accompanying claims.

In the accompanying drawings, Figure 1 is a longitudinal section through the casing of my improved lock, showing the working parts in elevation as they appear when in their relative unlocked positions.

Fig. 2 is a similar view with the working parts shown in their relative locked positions.

Fig. 3 is a cross sectional view, taken on the line 3—3 of Fig. 1.

Fig. 4 is a fragmental front elevational view, showing a mode of attaching the lock to a sliding door.

Fig. 5 is a side elevational view, partly broken away, illustrating how the lock may be secured to the door, and illustrating also a common type of key-operated mechanism for the operation of the lock.

Fig. 6 is a front elevational view of the lock as it appears from the outside of a door.

Fig. 7 is a fragmental front elevational view of the lock and the keeper for the latch bolt, this view showing in particular a modified form of latch bolt.

Fig. 8 is a cross sectional view, taken in the direction of the line 8—8 of Fig. 7.

With more particular reference to the accompanying drawings, wherein like characters of reference indicate like parts, the lock casing comprises two sections or plates, one 10, the rear section, which is intended to lie flat against a door as 11 upon the outside thereof, and the other 12, the front section, which is formed all around with the projecting flanges or sides 13, the edges of which meet the said rear section 10, as best shown in Fig. 3. These sections are rectangular in form, and at the corners the side flanges 13 are enlarged as at 14 in order to accommodate securing bolts as 15 (Fig. 5), which extend, in the present embodiment of the invention, through the rear section 10 and also through the door 11, where the securing nuts as 15′ are applied.

Formed integral with the rear section 10 are two sets of alined guide posts; one set 16 projecting forwardly spaced from the end of the casing which comes adjacent to the jamb 17, and the other set 18 projecting similarly from the opposite end thereof as shown. The length of these guide posts are such that they extend through openings in the front casing 12 with their outer ends lying flush with the outer or front surface thereof. Mounted upon these sets of guide posts for

sliding movement are bolts 19 and 20, respectively, with their opposite ends extending through suitable openings provided in the top and bottom side flanges 13. As shown in Figs. 1 and 2, the confronting sides of these sliding bolts are provided with teeth 21 to mesh with a gear 22 fast upon a shaft 23 which extends through the casing midway between said sliding bolts. One end of the shaft is journaled for rotation in a socket 24 provided upon the inner side of the front section 12, while the other end thereof extends through an opening 25 provided in the rear section 10.

Fast upon the shaft 23 in advance of the gear 22 is a tumbler or cam shaped device 26, about which extend the parallel sides 27 and 28 and connecting cross pieces therefor 29 and 30 of the body or shank portion of the latch bolt 31, which works through an elongated opening 32 provided in the side flange 13, and the forward end of which is made with a vertically hooked end 33 designed to engage over a keeper 34, secured to the jamb 17. The latch bolt thus formed extends lengthwise of the casing across the sliding bolts 19 and 20, is held against displacement by the front casing section 12, and is limited in its movements by the sets of guide posts 16 and 18. It is thus maintained for free swinging movement and is unconnected with any part except by a spiral push spring 35, mounted around a pin 36, one end of which slides through an opening provided in the cross connection 30, and the opposite end of which is pivotally connected to a lug 37, which projects from the side flange 13. The opposite ends of the push spring 35 are conected respectively with said cross connection and said lug, so that the spring normally urges the latch bolt into extended position. Another spring 38, angular in form, projects from the upper edge of the body part 27 so as to impinge against the adjacent guide post 16 in such manner as to force the latch bolt downwardly into horizontal position with the hook 33 engaged over its keeper.

The whole arangement is such that the latch bolt is thus engaged with its keeper when, through the actuation of the gear 22, the sliding bolts 19 and 20 are extended in opposite directions to lock the door 11 at its bottom and top edges by means of the bars 39 and 40, which are pivotally connected respectively with said sliding bolts, the remote ends of said bars being guided by staple devices as 41 so as to enter recesses as 42 or suitable keepers provided in the door jamb (Fig. 4). When the gear 22 is turned in the opposite direction to retract the sliding bolts and to withdraw the bars 41, the tumbler 26 impinges against the underside of the latch bolt member 27, lifting the latch bolt upwardly in an obvious manner, so as to disengage the hooked end 33 from its keeper, the end of the spring 38 in the latter instance, being accommodated by a recess 43 conveniently provided in the side flange.

As a means of positively locking the latch bolt against movement relatively with respect to the sliding bolts when the latter are in locked position, I prefer to provide the sliding bolt 19 with an integral lug 44 having a projecting pin 45 which enters the slot 46 provided in the upper edge of the latch bolt. As the sliding bolts 19 and 20 are moved by the gear into unlocked position, the pin 45 is withdrawn from its seat in an obvious manner to permit the raising of the latch bolt. It will be observed in Fig. 1 that when the latch bolt is raised by the tumbler 26, it still projects, in the present embodiment of the invention, beyond the end of the side flange 13, although released from its keeper in such manner that the sliding door 11 may be moved away from the jamb.

In order that this mechanism may be employed with types of keepers other than that like 34 herein shown, provision is made for withdrawing the latch bolt wholly within the lock casing by securing to cross connection 30, a stem 47 which works in a diagonal slot 48 provided in the casing section 12. Connected with this stem upon the outside of the casing is a thumb piece 49 which may be employed in an obvious manner to manually retract the latch bolt within the casing against the tension of the push spring 35, the latch bolt in this case sliding upon the opposite ends of the tumbler 26. To secure the latch bolt in retracted position, I provide a thumb piece 50 exterior of the casing, the stem of which works in a vertical slot 51, and to which behind the slot is secured a collar 52 and in front of the slot a longitudinal plate 53 whereby the thumb piece is held in operative position, so that the inner end of the stem may engage a slot 54 suitably provided in the upper edge of the latch bolt part 27. Exterior of the casing so as to slide upon the front face thereof, there is also carried by the pin 47 a longitudinal plate 55 which is considerably larger than the slot 48 so as to conceal the latter irrespective of the relative position of the thumb piece. Similarly, the outer elongated plate 53 is made considerably larger than the slot 51 so as to conceal the latter.

As a means of operating and locking the shaft 23 I provide any suitable cylinder lock having a rotatable barrel which may be locked and unlocked with its keeper. Thus, in Fig. 5, I show a barrel keeper 56 which is set in a suitable opening provided on the inner side of the door 11, this keeper at its inner end being provided with lugs 57 upon opposite sides, which are connected by means of bolts and screws as 58 with the

rear casing section 10. The rotatable key barrel 59 arranged in the keeper is provided with a reduced outer end 60 of square formation which projects into a suitable opening provided longitudinally in the said shaft 23. The barrel 59 is, of course, provided with the usual key slot for the reception of the proper key, by which the keeper pins are retracted and the barrel rotated in the usual way.

In Figs. 7 and 8, I illustrate a modified form of latch bolt 61, the end of which is here shown bent outwardly at right-angles to overlie the upwardly and outwardly projecting extension 62 of the keeper, this bolt being otherwise constructed and operated precisely like the latch bolt 31, and adapted to be used on a swinging door.

Having thus described my invention, what I claim is:—

1. A lock for doors including a casing, bolts slidably arranged therein and extending through the opposite sides of the casing, the confronting sides of said bolts being provided with teeth, a rotatable shaft, a gear thereon in mesh with the teeth of the respective bolts, a latch bolt slidably extending across said sliding bolts, means on said shaft to raise said latch bolt when said sliding bolts are moved into unlocked position, and means for positively locking said latch bolt when said sliding bolts are moved into locked position.

2. A lock for doors including assembled casing sections, a pair of parallel spaced apart bolts slidably extending through said sections, said bolts being provided with teeth on their confronting faces, a gear in mesh with the teeth of each of said bolts to actuate the same in opposite directions, a latch bolt slidable across said sliding bolts and working through the end of the assembled sections, key-controlled means for operating said gear, a tumbler operated by said key-controlled means for raising said latch bolt when said sliding bolts are moved into unlocked position, and means for locking said latch bolt with one of said sliding bolts when the latter are moved into locked position.

3. A lock for doors including a casing, a pair of parallel bolts slidable through said casing in spaced-apart relation, said bolts being provided with teeth on their confronting sides, a key-operated shaft midway between said sliding bolts, a gear fast on said shaft in mesh with the teeth of each of said bolts, a latch bolt slidable across said sliding bolts and adapted to extend beyond the casing to engage a keeper, a tumbler carried by said shaft to raise said latch bolt as the sliding bolts are moved into unlocked position, spring means for automatically extending said latch bolt into locked position as said sliding bolts are moved into locked position, and means for positively locking said latch bolt with one of said sliding bolts when the latter is moved into locked position.

4. In a door lock, assembled casing sections, bolts slidable therethrough in parallel spaced apart relation and provided with teeth on their confronting sides, a shaft operatively secured in the casing transversely thereof midway between said sliding bolts, a gear fast on said shaft in mesh with each of said sliding bolts to actuate the same in opposite directions, a latch bolt slidable across said sliding bolts and adapted to extend beyond said casing sections to engage its keeper, means carried by said shaft to raise said latch bolt from its keeper as said sliding bolts are drawn into unlocked position, means for automatically causing said latch bolt to engage its keeper as said sliding bolts are moved into locked position, means for positively locking said latch bolt with one of the sliding bolts when all of said bolts are forced into locked position, means for moving said latch bolt independently of said sliding bolts when all the bolts are in unlocked position, and key-controlled mechanism for operating said shaft.

5. A lock for doors including a casing, bolts slidable through said casing in spaced-apart parallel relation and provided with teeth on their confronting sides, a shaft rotatably arranged in said casing midway between said bolts at right-angles thereto, a gear fast on said shaft in mesh with each of said bolts to actuate the same in opposite directions, a latch bolt arranged in said casing to slide across said sliding bolts and adapted to extend beyond the casing to engage a keeper, a tumbler on said shaft to impinge and raise said latch bolt from its keeper as said sliding bolts are moved into unlocked position, spring means engaged between said latch bolt and said casing to normally urge said latch bolt into extended position, said tumbler being arranged to operate against the tension of said spring means when the bolts are moved into unlocked position, spring means for guiding and tilting said bolt into engagement with its keeper as the sliding bolts are moved into locked position, and means for actuating said latch bolt independently of said sliding bolts when the latter are in unlocked position.

6. In a lock for doors, the combination of two sliding bolts arranged in spaced-apart parallel relation, said bolts having teeth in their confronting faces, an operating gear in mesh with each of said bolts, a latch bolt slidably arranged across said sliding bolt and adapted to engage a keeper, means for causing said latch bolt to engage its keeper when said sliding bolts are moved into locked position, and means carried by one of said sliding bolts to engage said latch bolt hold-

ing it positively against disengagement when said sliding bolts are moved into locked position.

7. In a door lock, the combination of a sliding bolt provided with teeth on one side, a shaft, a gear mounted on said shaft in mesh with said sliding bolt to actuate the latter, a latch bolt arranged across said sliding bolt and adapted to engage a keeper, means on said shaft to raise said latch bolt from its keeper as said sliding bolt is moved into unlocked position, and means on said sliding bolt to engage said latch bolt whereby to hold the same positively locked with its keeper when the sliding bolt is moved into locked position.

In testimony whereof I have signed my name to this specification.

ISIDORE GREENFIELD.