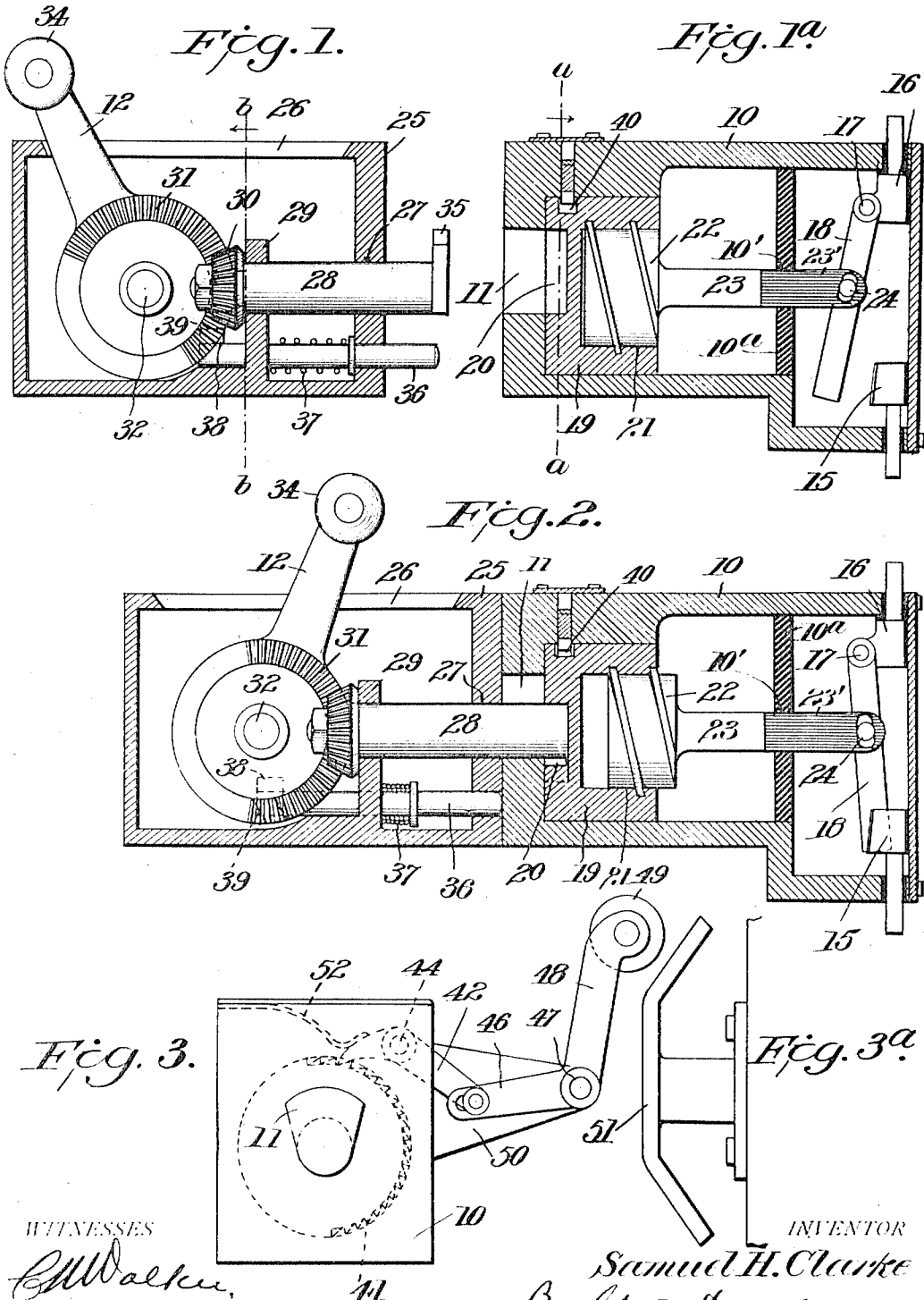


S. H. CLARKE.
DOOR LOCK.
APPLICATION FILED APR. 13, 1911.

1,061,449.

Patented May 13, 1913.

2 SHEETS—SHEET 1.



WITNESSES

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INVENTOR

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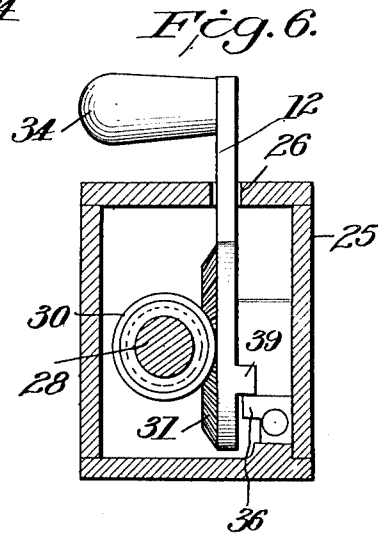
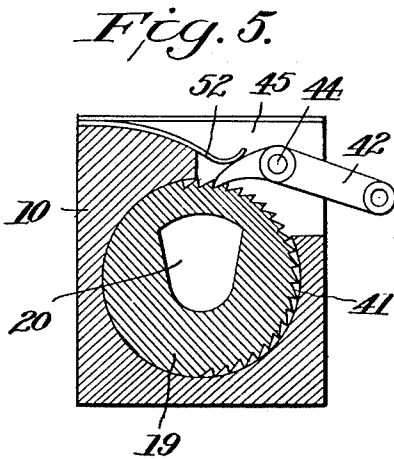
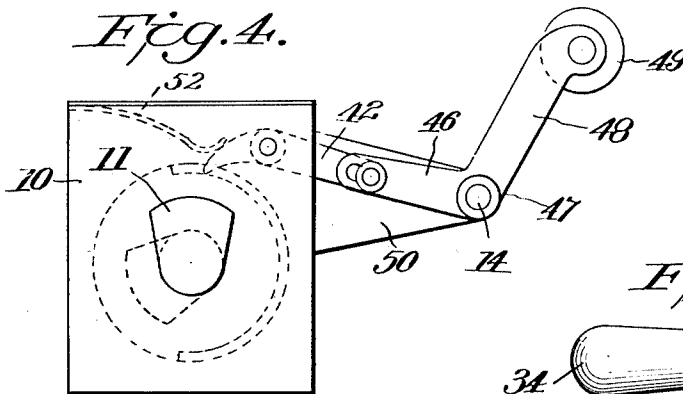
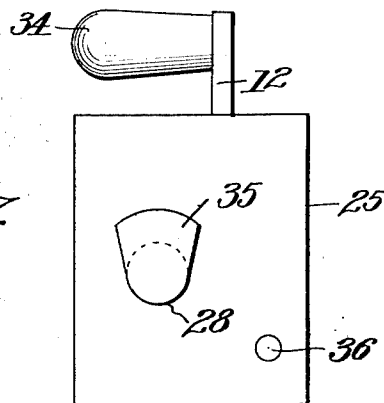


Fig. 7.



WITNESSES

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UNITED STATES PATENT OFFICE.

SAMUEL HERBERT CLARKE, OF RICHMOND, VIRGINIA.

DOOR-LOCK.

1,061,449.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed April 13, 1911. Serial No. 620,959.

To all whom it may concern:

Be it known that I, SAMUEL HERBERT CLARKE, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Door-Locks, of which the following is a specification.

This invention relates to door locks, particularly locks for elevator doors.

One object is to provide a lock for elevator doors embodying such characteristics that the door can be unlocked only when the elevator car is at the landing at which the door is located and to insure locking of the door when the car moves away from the door so as to avoid accidents which frequently occur by failure of the car operator to close the door when leaving a landing. Another object resides in the provision of an elevator door lock embodying among other characteristics features whereby the car cannot move away from a landing at which a door is left open.

A still further object is to provide a lock mechanism for electric elevator doors embodying means whereby the mechanism may assume locking position prior to closing the electric circuit and whereby the circuit may be opened prior to unlocking the mechanism to insure the door being locked whether the circuit is open or closed.

With the above and other objects in view, the present invention consists in the construction and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it being understood that changes may be made in the form, proportion, size and minor details without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—Figure 1 is a longitudinal sectional view of the latch mechanism. Fig. 1^a is a longitudinal sectional view of the keeper-mechanism. Fig. 2 is a sectional view of the device in locked position. Fig. 3 is an end view of the keeper-casing. Fig. 3^a is an end view of a portion of an elevator car having a projection to operate the lock mechanism. Fig. 4 is another end view showing the keeper-casing showing the lateral projection of the latch bolt turned in the socket of the rotatable member. Fig. 5 is a cross sectional view on

the line *a— a* of Fig. 1^a. Fig. 6 is a cross sectional view on the line *b— b* of Fig. 1. Fig. 7 is an end view of the latch casing.

Referring now more particularly to the accompanying drawings, the reference character 10 indicates a keeper-casing that is secured in any suitable manner to the framework of the elevator shaft and provided at one end with a segmental or other form of latch-bolt receiving-opening 11.

In the keeper-casing is located any suitable type of switch mechanism. For purposes of illustration I disclose one form of switch mechanism which may be employed for the purpose of making and breaking the electric circuit under the influence of which the operation of the elevator car (not shown) may be run. In the form illustrated, the characters 15 and 16 indicate terminals suitably insulated from the casing 10, and to the terminal 16 is pivotally connected at 17 a switch lever 18 which is adapted to be moved into and out of engagement with the contact 15 to make and break said circuit. It will thus be understood that I do not limit myself to the use of any particular means for making and breaking the circuit as any suitable type of mechanism may be used for the purpose without departing from the spirit of my invention.

The character 19 indicates a member mounted loosely in the keeper-casing for rotation therein adjacent the aforesaid opening 11 of the keeper-casing. On one side of this rotatable member 19 is a socket 20 of a segmental outline or of any form conforming preferably to the shape of the aforesaid opening 11 of the keeper-casing. This socket is adapted to be thrown into and out of alinement with the opening 11 as will be explained and on the opposite side of the rotatable member 19 is a screw threaded socket 21 adapted to receive the screw threaded head 22 of the switch operating bar 23, which latter has a portion 23' of insulated material which is slidably and pivotally connected at 24 to the knife or lever 18 of the switch mechanism so that as the rotatable member 19 is rotated in a manner to be hereinafter explained the lever 18 may be moved upon its pivot 17 into and out of engagement with the contact 15 to make and break the circuit, because, under the influence of the rotatable member, the connecting bar 23 is caused to recipro-

cate incident to the screw threaded connection between the head 22 of the bar and the screw threaded socket of the rotatable member 19.

To insure proper coöperation of the blade 18 with the terminal 15 it is preferred that a guide opening 10' be formed in the partition 10^a through which the bar 23 slides freely, said partition being preferably of insulating material and substantially isolating the switch mechanism from the other operative parts.

The character 25 indicates a latch-casing provided at its top with a slot or opening 26 and at one end has an opening 27 through which projects a latch-bolt 28 journaled at its inner end in a support 29 and at its inner end adjacent said support having a beveled gear 30 adapted to mesh with the beveled gear 31 journaled in the latch casing 25 on the axis 32.

The beveled gear 31 is the operating one of the two gears described and in order that it may be operated it is provided with a lever 12 which extends through the aforesaid slot or opening 26 in the latch casing and at its outer end preferably provided with a handle 34 so that the lever may be moved forwardly in said slot 26 to rotate the gear 31 for the purpose of rotating the latch-bolt through the medium of the meshing connection between the gears 30 and 31.

At the outer end of the latch-bolt is formed a lateral projection 35 which is preferably of the same formation as the shape of the opening 11 and socket 20 and which is adapted to pass through the opening 11 and into the socket 20 when the door, which carries the latch-casing, is moved to the jamb of the door opening at which the keeper casing is located. When the lateral projection of the latch-bolt enters said socket 20, the latch-bolt may be rotated by moving the aforesaid lever so as to cause rotation of the latch-bolt to cause the lateral projection of the latch-bolt to lie across the opening 11, behind the latter, to prevent opening of the door. This operation of the latch-bolt, by virtue of its lateral projection fitting in the socket 20 of the rotatable member, causes the latter to rotate, and by virtue of the screw threaded connection between the socket 21 and the head 22 of the switch operating bar 23, the latter is caused to slide and effect such movement of the switch lever 18 as will cause the latter to engage the terminal 15 and thereby close the circuit under the influence of which the car is run so that the latter may be moved away from the landing at which the particular door is located. The car cannot move while the circuit is broken but when the circuit is made the car may be moved up or down in its shaft.

To prevent turning of the latch bolt 28,

when the door of the elevator car is being moved to closed position by the operator if he grasps the handle 34 to close the door, there is slidably mounted in the latch casing a bolt 36 which projects normally through the front of the latch casing, and which, at its inner end, has a lateral projection 38 designed to engage the shoulder 39 on the beveled gear 31 to prevent rotation of the latter as the operator slides the door. The moment that the outer end of the bolt 36 engages the forward end of the keeper-casing 10, however, the bolt 36 is forced inwardly against the action of the spring 37 so as to clear its lateral projection 38 of the shoulder 39 on the operating gear 31 and thereby permit the latter to turn and to cause corresponding turning of the latch-bolt to effect turning of the rotatable member and a consequent positioning of the lateral projection of the latch-bolt with relation to the opening 11 of the keeper-casing to insure locking of the door. Thus by a single stroke of the hand of the car operator the latch-bolt 28 is thrown into the socket 20 of the rotatable member 19 and as soon as the lateral projection 35 of the latch-bolt enters said socket 20 of the rotatable member 19, a slight continuation of the stroke of the hand of the car operator causes the latch-bolt 28 to turn with the result that the lateral projection 35 thereof will lie across the opening 11 behind the latter as indicated in dotted lines in Fig. 4 so that the door becomes locked and the car may then pass up or down under the influence of the controlling mechanism of the car (not shown).

When the door is locked and the car is moved away from the door the latter cannot be opened until the car returns and in order to insure against opening of the door by unauthorized persons I preferably provide the rotatable member 19 with an annular groove 40 preferably in the bottom of which are teeth 41, one of which teeth is engaged by the pawl 42 pivoted at 44 in the recess 45 of the keeper-casing. To the outer end of the pawl 42 is pivotally and slidably connected the arm 46 of the double arm lever 47 pivoted at 14 on the car 50 and whose other arm 48 has a roller 49 journaled therein and arranged to be engaged by the projection 51 secured to the car. If desired a spring 52 may bear upon the pawl 42 to insure its engagement with the teeth 41, but this spring may be dispensed with by having the double arm lever 47 so mounted that it will by gravity throw the pawl into engagement with the said teeth.

While I have just described means whereby the lock cannot be unfastened until the car reaches the landing at which the lock is located, it will be understood that any other common means may be substituted therefor, the particular means illustrated for this pur-

pose being shown in order to illustrate some form of operative connection for the purpose specified. It will thus be seen that the locking operation of my improved lock takes place prior to the closing of the circuit, because the minute that the rotatable member 19 is rotated, with the lateral projection 35 of the latch-bolt 28 in the socket 20, the lateral projection passes out of registration with the opening 11 and by continued movement of the rotatable member 19, the switch lever 18 is finally thrown into co-operative relation with the terminal 15, closing the circuit. It will also be seen that the circuit opens prior to the unlocking operation, because the lever 18 is withdrawn from the terminal 15 prior to the time that the lateral projection 35 of the latch-bolt 28 coincides with the opening 11, whereby the door is locked all the time the current is on or circuit closed and will not be unlocked until the circuit is opened.

What is claimed is:—

1. The combination with a latch-casing, a rotatable latch-bolt in the casing, and means for operating the latch-bolt; of a keeper-casing provided with an opening in one end to receive the latch-bolt, a switch mechanism mounted in the keeper-casing, a rotatable member mounted in the keeper-casing and provided on its side adjacent the opening of the casing with a recess to receive the outer end of the latch-bolt and on its opposite side having a screw threaded socket, and a bar connected to the switch and provided with a threaded head having working fit in the screw threaded socket of the rotatable member so that upon rotation of the latter under the influence of the aforesaid latch bolt operating means the switch may be opened or closed.

2. The combination with a latch-casing, a rotatable latch-bolt, and means for operating the latch-bolt, of a keeper-casing provided with an opening in one end to receive the latch-bolt, a switch mechanism in the keeper-casing, a rotatable member mounted in the keeper-casing for engagement by the latch-bolt, the aforesaid operating means being capable of effecting rotation of the rotatable member when the latch-bolt is in engagement with the latter and rotated in the same direction as the latch bolt and an operative connection between the rotatable member and said switch mechanism to operate the latter upon rotation of the rotatable member.

3. The combination with a latch-casing, a rotatable latch-bolt provided at its outer end with a lateral projection, and means for operating the latch-bolt, of a keeper-casing provided with an opening in one end to receive the latch-bolt, a rotatable member mounted in the keeper casing adjacent said opening and on its side adjacent the opening

having a socket adapted to be thrown into and out of alinement with said opening, said socket being adapted to receive the lateral projection of the latch-bolt and the rotatable member being rotatable under the influence of the latch-bolt and in the same direction of rotation as the latch-bolt when the latter is turned, and a switch mechanism connected with the rotatable member and operable when the rotatable member is rotated.

4. The combination with a latch-casing, a latch-bolt in said casing, and means for rotating the latch-bolt, of a keeper-casing provided with an opening to receive the latch-bolt, a rotatable member in the keeper-casing adapted to be engaged by the latch-bolt when the latter has entered the keeper casing and to have operative connection therewith to rotate it axially, a switch mechanism, means connecting the switch mechanism and the rotatable member for operating the former when the latter is rotated, and means for preventing rotation of the bolt prior to its operative connection with said rotatable member.

5. In a lock for elevator doors, a keeper-casing, a switch mechanism in said casing, a rotatable member in the casing and operatively connected to the switch mechanism, a latch casing, a latch-bolt in the latch-casing, means for operatively connecting the latch-bolt with said rotatable member, means for preventing rotation of the bolt prior to its operative connection with the rotatable member, and means for detachably securing the bolt and rotatable member against rotation after the lock is in operative locked condition.

6. In a lock for elevator doors, a keeper-casing provided with a partition having a central opening, a switch mechanism in said casing on one side of said partition, a rotatable member in the casing on the opposite side of the partition and having a screw threaded socket, an operating rod extending through the perforation in said partition and operatively connected to said switch mechanism and having a screw threaded head operative in the screw threaded socket of the rotatable member, a latch casing, a latch-bolt in the latch casing, and means for operatively connecting the latch-bolt with said rotatable member to effect locking and unlocking of the lock and to operate said switch mechanism.

7. In a lock for elevator doors, a keeper-casing provided with a partition having a central opening, a switch mechanism in said casing on one side of said partition, a rotatable member in the casing on the opposite side of the partition and having a screw threaded socket, an operating rod extending through the perforation in said partition and operatively connected to said switch

mechanism and having a screw threaded head operative in the screw threaded socket of the rotatable member, a latch casing, a latch-bolt in the latch casing, means for operatively connecting the latch-bolt with said rotatable member to effect locking and unlocking of the lock and to operate said switch mechanism, and means for detachably securing the rotatable member against rotation after the lock is in operative locked position.

8. The combination with a latch casing, a rotatable latch bolt in said casing provided with a head, and means for operating the latch bolt, of a keeper-casing provided with an opening to receive the head of the latch bolt, a rotatable member in the keeper casing provided with a socket to receive the head of the latch bolt, a switch mechanism, said rotatable member having another socket, a connection between said other socket of the rotatable member and the switch mechanism and disposed in alignment with the latch bolt and the rotatable member and operable under the influence of said rotatable member when the latch bolt rotates the latter.

9. In a lock for elevator doors, a keeper-casing, a switch mechanism in said casing, a rotatable member in the casing and operatively connected to the switch mechanism, a latch casing, a latch-bolt in the latch casing, means for operatively connecting the latch-bolt with said rotatable member, said rotatable member having a screw threaded socket, and a connection between the switch mechanism and the screw threaded socket of the rotatable member to effect opening and closing of the switch.

10. In a lock mechanism for elevator doors, a latch casing, a latch-bolt in said casing, and means for operating the latch-bolt, of a keeper-casing provided with an opening to receive the latch-bolt, a rotatable member in the keeper casing adapted to be engaged by the latch-bolt when the latter has entered the keeper-casing and to have operative connection therewith to effect locking of the lock, a switch mechanism, and a connection between the switch mechanism and the rotatable member movable in the line of the axis of the latter for closing the switch subsequent to the initial movement of the rotatable member.

11. The combination with a latch casing, a rotatable latch bolt in said casing, and means for rotating the latch bolt, of a keeper casing provided with an opening to receive the latch bolt, a rotatable member in the keeper casing adapted to be engaged by the rotatable latch bolt when the latter has entered the keeper casing and to have operative connection therewith to rotate with the rotatable member, a switch mechanism and a connection between the switch mechanism

and the rotatable member for reciprocation bodily in a longitudinal direction to open and close said switch, said rotatable members and said connection between one of the rotatable members and the switch mechanism being disposed in axial alignment.

12. The combination with a latch casing, a rotatable latch bolt in said casing, and means for rotating said latch bolt, of a keeper casing provided with an opening to receive said latch bolt, a rotatable member in the keeper casing adapted to be engaged by the latch bolt when the latter has entered the keeper casing and to have operative connection therewith so that the latch bolt and the rotatable member may be rotated axially in the same direction, a switch mechanism, and means connecting the switch mechanism and the rotatable member of the keeper casing so that upon rotation of the latch bolt and the rotatable member the switch mechanism may be operated.

13. The combination with a keeper casing, of a rotatable member mounted therein, a switch mechanism, a connection between the switch mechanism and the rotatable member and a rotatable latch bolt arranged for operative connection with said rotatable member and adapted to rotate on the same longitudinal axis as the rotatable member to rotate the latter and operate said switch mechanism.

14. The combination with a keeper casing, of a rotatable member mounted therein, a switch mechanism, a connection between the switch mechanism and the rotatable member and a rotatable latch bolt arranged for operative connection with said rotatable member and adapted to rotate on the same longitudinal axis as the rotatable member to rotate the latter and operate said switch mechanism, and means for preventing rotation of the latch bolt prior to its operative connection with the rotatable member.

15. The combination with a keeper casing, of a rotatable member mounted therein, a switch mechanism, a connection between the switch mechanism and the rotatable member and a rotatable latch bolt arranged for operative connection with said rotatable member and adapted to rotate on the same longitudinal axis as the rotatable member to rotate the latter and operate said switch mechanism, means for preventing rotation of the latch bolt prior to its operative connection with the rotatable member, and means for detachably securing the bolt and rotatable member against rotation after the lock is in operative locked condition.

16. The combination with a keeper casing, of a rotatable member mounted therein, a switch mechanism, a connection between the switch mechanism and the rotatable member and a rotatable latch bolt arranged for operative connection with said rotatable mem-

ber and adapted to rotate on the same longitudinal axis as the rotatable member to rotate the latter and operate said switch mechanism, and means for detachably securing
5 the bolt and rotatable member against rotation after the lock is in operative locked condition and the switch closed.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL HERBERT CLARKE.

Witnesses:

JAS. W. BROADDUS,
WALTER HELPER NOBB.