M. HEGBOM.

AUTOMATIC LOCKING DEVICE FOR HATCHWAY DOORS.

APPLICATION FILED JAN. 7, 1909.

963,223.

Patented July 5, 1910.

2 SHEETS—SHEET 1.

Fig. 1

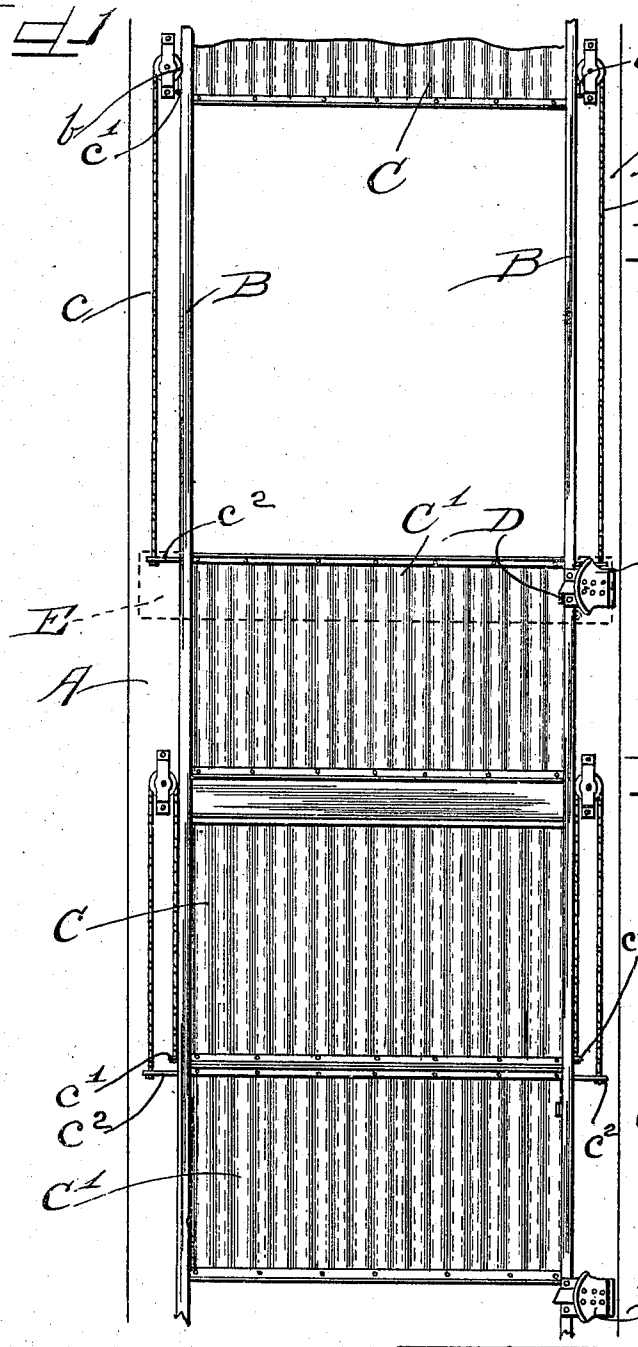


Fig. 7

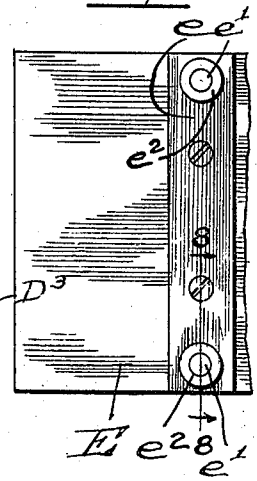
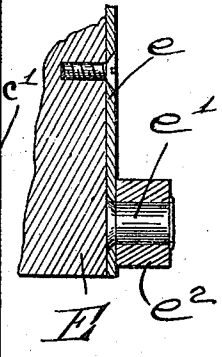


Fig. 8



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2

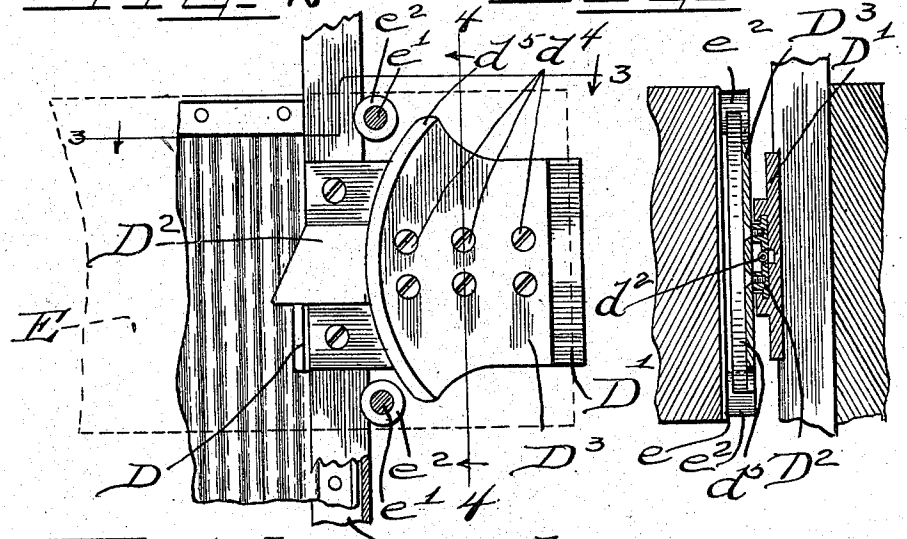


Fig. 4

Fig. 3

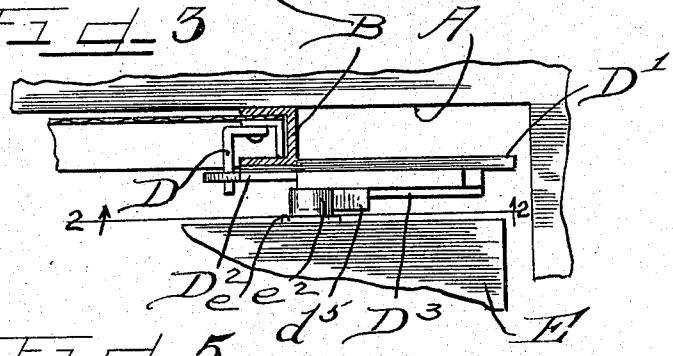


Fig. 5

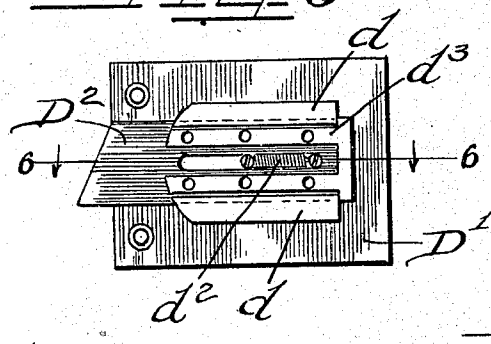
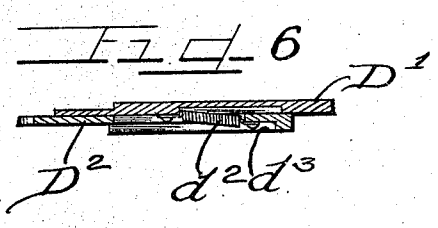


Fig. 6



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UNITED STATES PATENT OFFICE.

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AUTOMATIC LOCKING DEVICE FOR HATCHWAY-DOORS.

963,223. Specification of Letters Patent. Patented July 5, 1910.

Application filed January 7, 1909. Serial No. 471,109.

To all whom it may concern:

Be it known that I, MARSELIUS HEGBOM, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Locking Devices for Hatchway-Doors; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of locking devices for hatchway or elevator doors adapted to lock automatically closing doors, in open relation.

Heretofore hatchway doors have been introduced extensively into use and comprise upper and lower oppositely movable, mutually counterbalancing door sections supported in suitable ways or guides at each side of the door opening and adapted to be actuated when moved from each other to open the doorway and when moved oppositely to close the same. Usually, heretofore, such doors have been constructed with the sections of approximately the same weight or, in other words, approximately on a balance and connected by a chain which is trained over a suitable pulley and at or near the top of the door opening. Such balanced construction, of course, necessitates the attention of the operator both in opening and in closing the door, and in consequence, it sometimes happens that doors have been left open by careless employees after the car has left the floor from which said door opens and serious accidents and loss of life have sometimes been occasioned thereby not only because of employees or others falling down the elevator shaft, but also because the open door permitted the rapid spread of fire.

The object of this invention is to provide a device adapted to positively lock the door in open position after said door shall have been opened but which insures the release of the door to permit the same to close as the cage leaves the floor from which the door opens.

It is also an object of the invention to provide self-closing doors of the class described in which the upper section of the door is made sufficiently heavier than the lower to necessitate the closure of the door by gravity when released from the lock and to provide in connection therewith an automatic latch adapted to engage one of the sections to lock the door in open position.

The invention consists in the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is an inner face view of an installation embodying my invention and showing two doors provided therewith. Fig. 2 is a section on line 2—2 of Fig. 3. Fig. 3 is a section on line 3—3 of Fig. 2. Fig. 4 is a section on line 4—4 of Fig. 2. Fig. 5 is a face view of the back plate and bolt for the lock with the outer cam plate removed. Fig. 6 is a section on line 6—6 of Fig. 5. Fig. 7 is a fragmentary view of the edge of the cage platform showing the rollers thereon for retracting the bolt. Fig. 8 is an enlarged section on line 8—8 of Fig. 7.

As shown in the drawings: A, indicates one of the inner walls of the elevator shaft on which is secured on each side of the door openings continuous grooved guides B, which may extend from the top to the bottom of the elevator shaft continuously, if preferred, or may be installed in suitable lengths for the individual doors, as desired. Slidable between said guides or ways B, are the doors, as shown of the common type of hatchway doors, and comprising upper and lower oppositely movable sections C—C′, which are of a length together to entirely close the door opening. These are mutually supported over suitable pulleys *b*, secured at the top of the door opening and on each of the guides B, by means of chains or other flexible connections, *c*. The upper ends of the chains are connected to an outwardly projecting stud or finger *c′*, engaged at the bottom rail of the upper section and the lower end of which is engaged to an outwardly projecting stud or finger c^2, extending from the top of the lower section. Said upper section may be either wider than the lower, as shown in Fig. 1, or the upper section may be weighted in any suitable manner to produce an unbalanced relation of the sections tending to close the doors when the doors are open, the object of the apparatus being to insure the positive closing of the door in every instance except when held open by the locking device with the car at the floor.

Secured on one of the ways or guides B,

at the bottom of the door opening, as shown in Fig. 1, is a spring bolt adapted to catch and engage a complemental lip or projection D, near one edge of the lower door section. Said bolt, as shown, comprises a base or bed plate D′, which may be riveted or bolted onto the way or guide, and if desired onto the wall of the shaft, and is provided with guides d, extending transversely thereof and parallel to each other and undercut to retain the bolt D^2, slidable on the base plate. Said bolt, as shown, is of a length to project beyond the edge of the base plate into position to be engaged by the projection D, just as the elevator door is fully opened and as shown, the projecting end of said bolt D^2 is inclined or beveled downwardly so that said projection acts to retract the bolt until it has passed the bolt.

Secured in a central slot in the bolt is a strong pulling spring d^2, which is engaged at one end on the bed plate through a slot in the bolt and at its rear end is engaged on the bolt, thus acting at all times to pull the bolt forwardly to protrude beyond the bed plate, as shown in Figs. 5 and 6, but permits the bolt to be readily retracted to permit the doors to be fully opened or to be closed.

Ribs d^3, are provided on said bolt and provided with threaded apertures to receive screws d^4, whereby a cam plate D^3, for actuating the bolt is secured thereto. Said cam plate may be constructed of cast or pressed metal as preferred, and is provided with apertures registering with the threaded apertures in the ribs d^3, of the bolt, to permit the same to be rigidly secured or bolted thereon, and as shown, is provided on its edge adjacent the elevator door with an upstanding flange d^5, the outer surface of which adjacent the door is curved in an arc.

On the edge of the elevator platform E, adjacent the door and as shown, just outside the guide or way B, is secured a metallic strip or bracket e, extending transversely the edge of the platform and on the upper and lower ends of which are rigidly engaged outwardly extending cylindric studs e', on each of which is journaled an anti-friction roller e^2. These are so positioned and disposed that when the platform is at the level of the floor (the door for which is open), one of said rollers e^2, is positioned above the cam plate for the bolt and in position to engage the same if the cage moves downwardly, and the other thereof is positioned below said cam plate and in position to engage the same should the cage move upwardly in either event retracting the bolt.

The operation is as follows: The cage, of course, may be operated freely up and down the shaft without affecting the door to open the same, the rollers e^2, however, retracting each bolt as it passes the same whether the cage be moving up or down the shaft. Whenever a door is opened manual force is required sufficient to overcome the extra weight in the upper section and the door having been fully opened, the projection D, on the door section is engaged by the bolt, as shown in Figs. 1 and 2, to positively lock the door in open position until said bolt shall have been retracted. If the car is at the floor from which the said door opens, movement of the car in either direction retracts the bolt by the engagement of the rollers e^2, against the cam plate D^3, and in consequence on account of the greater gravity of the upper door section the door promptly closes. Should the door be open, as may very rarely occur when the elevator is not at that floor, the next passage of the elevator car or platform past said door opening of necessity retracts the bolt without requiring the attention of the operator and the door must close by gravity.

Obviously from the construction described, it is impossible for the negligence of the operator to result in leaving one or more doors open for any considerable period of time or for any time longer than necessary for the car to move from the floor from which said door opens.

Of course, I am aware that the particular cam plate, and, of course, the spring connection and the particular form of the bolt may vary through a considerable range. The form adopted, however, causes but little friction, permits the bolt to be very easily and almost noiselessly retracted, and is sure and positive both in holding the door in its open position and immediately releasing the same for automatic closing with the further movement of the car. Of course, the roller or rollers may be secured to the bolt and the cam on the platform.

Of course, I am aware that details of arrangement and construction may be varied. I therefore do not purpose limiting this application for patent otherwise than necessitated by the prior art.

I claim as my invention:

1. The combination with the sections of a door of a projection on one of the door sections, a bolt secured at one side of the door and adapted to engage said projection when the door is fully opened, and a plurality of anti-friction rollers pivoted to the elevator platform movable past said door for independently releasing the bolt.

2. The combination in an elevator shaft of the hatchway doors embracing for each door opening oppositely slidable upper and lower sections, mutually supported to close by gravity when opened, a spring bolt secured at one side of the door at approximately the floor, and holding the lower door section when the door is fully open, a curved cam member rigidly secured to the bolt, and members on the elevator platform adapted

each to engage the cam member to retract the same to release the door when the platform moves above or below said floor.

3. The combination in an elevator shaft of a hatchway door embracing an upper section and a lighter lower section mutually supporting each other, to normally close by gravity when opened, an automatically acting bolt secured in position to engage and hold one of said sections from movement when the door is fully opened, a segment shaped cam plate secured to the bolt and rollers arranged on the elevator platform and positioned one on each side of the bolt when the platform is at the floor level, one of said rollers acting to retract the bolt with downward movement of the car, the other acting to retract the same with upward movement thereof, in either case releasing the door.

4. The combination with the guide or way for a hatchway door of a sliding spring pressed bolt engaged thereon and adapted to project into position to engage the door movable in the way, and rollers on the elevator platform adapted to retract the bolt as the platform passes the same.

5. A device for the purpose specified embracing a base plate adapted to be rigidly secured or bolted to the guide or way for a sliding door, a bolt slidable therein to project over and past the face of the door when open, a spring acting to hold said bolt so extended, a cam plate secured on said bolt, to retract the same, and means for engaging said cam plate to release the bolt.

6. A lock embracing a base plate having ribs thereon, a sliding bolt therein having a longitudinal slot, a spring engaged at one end to the base plate through said slot and at the other on the bolt, an actuating plate secured to the sliding bolt, an element movable past said bolt and rollers thereon for engaging the actuating plate to retract the bolt.

7. The combination with mutually supporting door sections adapted to normally close by gravity when released, of a projection on one of the doors, a sliding spring pressed bolt secured at one side of said doors and adapted to engage said projection when the doors are fully opened, an elevator platform movable past the door, and upper and lower rollers thereon adapted to engage a part on said bolt, to retract the same to permit said doors to close by gravity.

8. In a device of the class described a locking member adapted to engage and hold a door in open position, a cam member secured thereto, a member adapted for attachment to an elevator car and rollers journaled thereto to engage the cam and retract the bolt to permit closing of the door when the car moves in either direction.

9. In a device of the class described a locking bolt, a spring for holding the same in locking position and means for retracting said bolt comprising a member, studs secured thereto and rollers journaled on said studs.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

MARSELIUS HEGBOM.

Witnesses:
C. W. HINES,
LAWRENCE REIBSTEIN.