

E. D. TOOPS.

APPARATUS FOR OPERATING HATCHWAY DOORS.

No. 560,010.

Patented May 12, 1896.

Fig. 1.

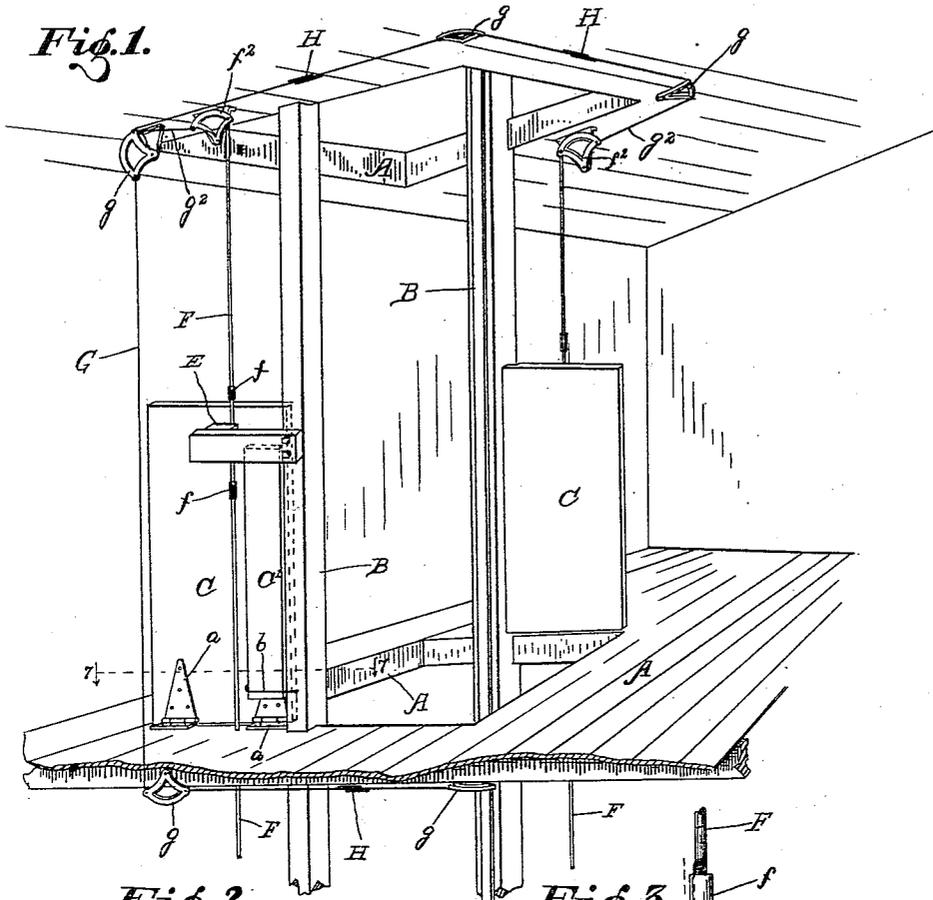
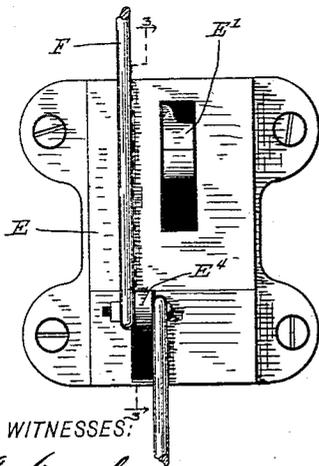


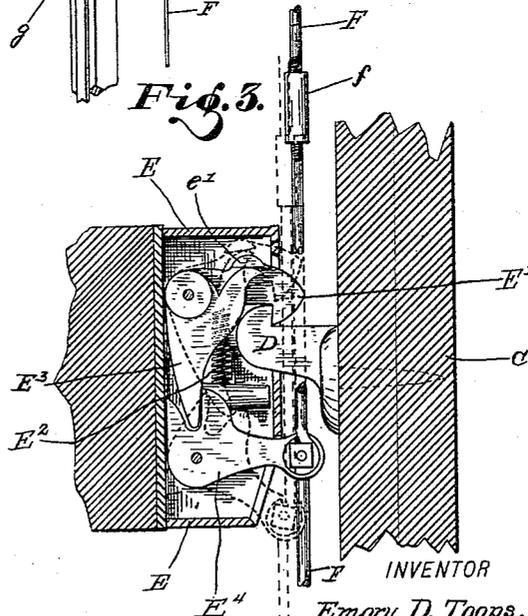
Fig. 2.



WITNESSES:

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Fig. 3.



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Fig. 4.

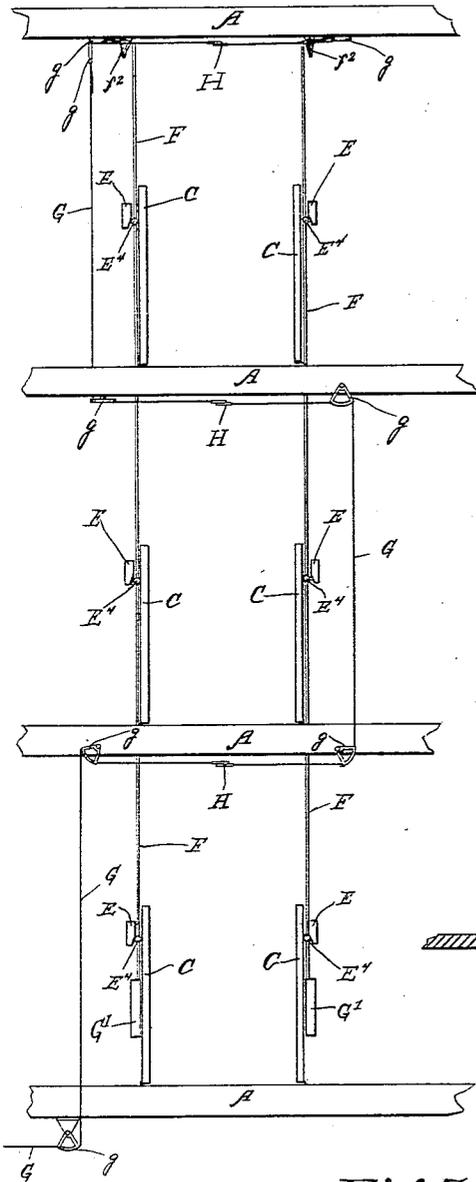


Fig. 5.

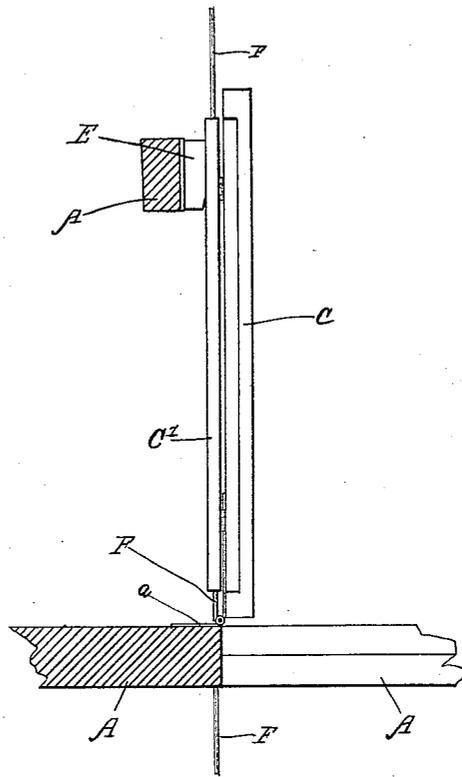


Fig. 6.

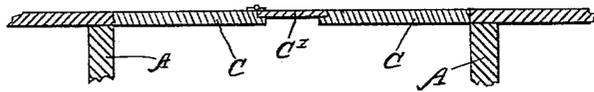
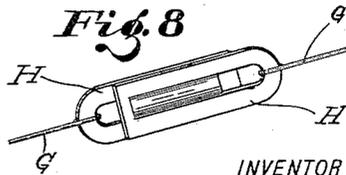
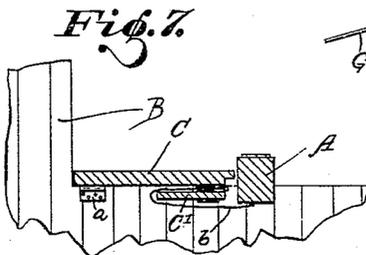


Fig. 8.



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UNITED STATES PATENT OFFICE.

EMORY D. TOOPS, OF INDIANAPOLIS, INDIANA.

APPARATUS FOR OPERATING HATCHWAY-DOORS.

SPECIFICATION forming part of Letters Patent No. 560,010, dated May 12, 1896.

Application filed September 11, 1894. Serial No. 522,712. (No model.)

To all whom it may concern:

Be it known that I, EMORY D. TOOPS, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Apparatus for Operating Hatchway-Doors, of which the following is a specification.

As is well known, elevator-hatchways are a source of great danger in cases of conflagration, as the fire not only has access through them from floor to floor of a building, but the straight open space formed thereby serves as a draft-flue, intensifying the fierceness of the flames. It is therefore a matter of great importance that some means should be provided whereby such hatchways may be automatically closed in case of fire, and this is the object of my present invention.

Said invention consists in various improvements in the construction and arrangement of parts whereby the purpose indicated may be attained.

A hatchway provided with doors having a desirable form of my apparatus connected therewith will be first fully described, and the novel features thereof then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a perspective view of a hatchway apparatus embodying my said invention; Fig. 2, a front elevation of the lock separately; Fig. 3, a vertical sectional view through the case of said lock, exposing its mechanism; Fig. 4, a diagrammatic elevation illustrating the course of the wires by which the lock-catches may be operated; Fig. 5, a sectional view through one of the doors, showing the means by which it is held open in operation; Fig. 6, a detail sectional view illustrating the hatchway closed; Fig. 7, a detail sectional view on the dotted line 7 7 in Fig. 1, and Fig. 8 a detail view of a suitable fusible link.

In said drawings the portions marked A represent the framework, including the floors and ceilings, of the building in which the hatchways are located; B, the vertical posts which form the ways or tracks for the elevator; C, the hatchway-doors; D, catches on said doors; E, locks with which said catches

engage; F, vertical rods or wires connecting the series of locks, whereby they are immediately operated; G, wires connected to said rods F, whereby they may be operated and by which the weight of said rods is ordinarily carried, and H fusible links, which are preferably inserted at suitable points in the wires G.

The framework A and posts B are or may be of any usual or desired construction and will not be further described herein except incidentally in describing the invention.

The doors C are hinged to the floor A by hinges *a* in such a manner (illustrated in Figs. 1 and 5) that, when released, they will fall shut of their own weight. There should be two of these doors to each hatchway, one to cover that portion of the space on each side of the posts B. In order to cover the small strip of open space that would otherwise be left between said posts B, I hinge to one of these doors C a supplemental door or flap C', which is adapted to be thrown over and cover said space, as best shown in Fig. 6. As a means of throwing this supplemental door or flap shut, I attach to the post B, near the floor, a wire *b*, which extends around the edge of said supplemental door or flap C' and is attached to the main door C at or near the hinge-line of said supplemental door. Obviously, when the door C is released and falls, this wire *b* will straighten out, thus throwing the supplemental door C' over from the position shown in Fig. 1 to the position shown in Fig. 6. For convenience sake and to make a smooth surface when these doors are closed, I prefer to rabbet the edges of the doors C, as also most plainly shown in Fig. 6, and these rabbets receive the edges of said supplemental door C', leaving all the doors of even surface on top.

The catches D are plain simple rigid catches, firmly attached to the tops or backs of the doors C and are adapted to engage with the movable catches of the locks E when the doors are raised to position, as shown in Figs. 1, 3, and 5.

The locks E contain a pivoted or movable catch E', which is adapted to be engaged with or disengaged from the catch D on the door C and is normally held into engagement with said catch D by a spring E². This pivoted catch I prefer to operate by a combination of

two bell-crank levers E^3 and E^4 , the former of which engages with a projection e' on said pivoted catch E' at its upper end. The bell-crank lever E^4 has at one end a fork, which
 5 engages with the bell-crank lever E^3 , while the other end extends to the outside of the case, where it is connected to the rod F . The operation is that when the rods F fall or are pulled downwardly they operate through the
 10 bell-crank levers E^4 and E^3 to raise the pivoted catch E' out of engagement with the fixed catch D on the door C , thus releasing the latter and permitting the door to fall, the pull of the rods thus acting reversely to the
 15 tension of the spring E^2 . As will be readily understood, the pivoted catches E' may be operated independently of the other mechanism, as well as through the medium of the levers E^3 and E^4 , and thus the catches D on the doors C
 20 may be disengaged and said doors enabled to be closed by hand, if desired, by simply moving said pivoted catches E' out of engagement with said catches D . Thus while the apparatus is adapted to operate all the doors simultaneously it does not preclude the independent operation of any of the doors when
 25 desired, as the projection e' on the catch E' rests loosely upon the lever E^3 , which operates it, instead of being connected thereto by any link or pivot, and the spring E^2 , which holds said catch into engagement with the catch D , may as readily be distended by pushing directly on said catch as through the medium of the other levers.

35 As will be observed by an examination of the drawings, particularly of Fig. 3, (which is a scale-drawing made from a full-sized working device,) the parts are so proportioned that the travel of the rod or rods F is greater than
 40 that of the catches E' —that is, while said rods and the outwardly-extending arms of the levers E^4 travel a considerable distance downwardly the hooks of the catches E' only travel sufficiently upwardly to escape the
 45 fixed catches D , or, in other words, the shorter arms of the lever mechanism are on that side of the lever pivots or fulcrum nearest the catch-points, and the longer arms on that side toward the point of union with the rods.
 50 The advantage of this is that the rod or rods F , being of considerable length, are likely to expand and contract considerably under the varying degrees of temperature to which they are subjected, and if the catches E' were
 55 moved as much as the entire contraction and expansion those at the most distant point from the supporting-points of said rods F might be raised out of engagement with said fixed catches D . As it is of course of vital
 60 importance that the engagement should be maintained until purposely released, this feature is of much consequence.

The rods F run vertically through the floors between the stories of the building and are
 65 connected at each story with the bell-crank levers E^4 of the locks. At their upper ends they are connected to the wires G , as will be

presently described, and at their lower ends they may have weights G' to accelerate their downward movement when released, if them-
 70 selves not heavy enough to insure the prompt detaching of the catches by their own weight. Couplings f enable these rods not only to be made in lengths, but said couplings being
 75 screw-threaded permit an accurate adjustment.

The wires G run from point to point throughout the building around the hatchways in the various floors, passing from one side of the hatchway to the other, and are con-
 80 nected at the angles by bell-crank levers g' , located at appropriate points, as shown. At the upper end branches g^2 run to the bell-crank levers f^2 , to which the rods F are suspended, and thus said rods F are kept in raised
 85 position by their connection to these wires. At the lower ends the wire G may run off underneath the floor or otherwise to the outside of the building, where it may be secured in any desired manner and at any appropriate
 90 place, as in a watchman's box, so that a watchman may release it by hand, if desired, and thus close the hatchways. By whatever means these wires are released the effect is,
 95 as will be readily understood, at once to permit the rods F to drop, thus detaching the catches E' and D and permitting the doors C to fall shut.

The fusible links II are or may be of any desired construction and are interposed at
 100 various points in the wire G throughout its length. Any desired number of these links may of course be employed—one or more—but I prefer to use at least one on each story. The effect is that when the temperature rises
 105 beyond a certain point, wherever one of these fusible links is placed, the wire parts at that point and the rods F are permitted to fall with the result already described.

I have described with particularity the ar-
 110 rangement and construction of apparatus embodying my invention; but obviously the mechanical details may be varied from in certain particulars without departing from my
 115 invention.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a hatchway, of doors hinged to the sides thereof and adapted
 120 to fall shut and close the hatchway, catches on said doors, catch-locks secured to convenient points alongside the hatchway structure with which the catches on the doors may en-
 125 gage, rods or wires running from said catch-locks by which they may be operated, wires connected to and running from the upper ends of said wires or rods down from story to story and across alongside the hatchway
 130 in each story, and embodying a fusible link or links in each horizontal portion, the whole being constructed, arranged and operating substantially as shown and described.

2. The combination, with a hatchway, of

doors hinged to the sides thereof and adapted when released to close by their own gravity, suitable catches for holding the same open, means for operating said catches, a supplemental door or flap C hinged to one of said doors and adapted to close the space between the posts of the elevator, and a cord or wire *b* attached near the hinge-point of said flap at one end and passing around said flap and attached to the post B at the other end, whereby said flap may be also thrown over and shut as the main doors are shut, substantially as shown and described.

3. The combination, with a hatchway, of doors hinged to the sides thereof and adapted to close when released by their own gravity, rigid catches on said doors, pivoted catches attached to some convenient adjacent portion of the framework and arranged to be operated independently when desired, levers pivoted near said catches and adapted to engage with and operate the same, and attached rods connecting a series of said levers whereby by the downward pull or movement on said rods said pivoted catches may be also operated simultaneously, substantially as set forth.

4. The combination, with hatchway-doors provided with suitable supporting-catches, of locks containing pivoted catches adapted to engage with catches on the doors, and levers E^3 and E^4 in said locks for raising said catches, said levers E^4 being connected to operating rods or wires.

5. The combination, with hatchway-doors provided with suitable supporting-catches, of locks containing pivoted catches adapted to engage with the catches on the doors, operating rods or wires, and intermediate lever mechanism in said locks, whereby said catches are operated from said rods or wires, the fulcrums whereof are arranged nearer the catch-points than the point of union with the rods, whereby the catch movement is rendered less than the rod movement, substantially as and for the purposes set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 8th day of September, A. D. 1894.

EMORY D. TOOPS. [L. S.]

Witnesses:

CHESTER BRADFORD,
JAMES A. WALSH.