H. C. WALDMAN.

FIRE DOOR.

APPLICATION FILED NOV. 20, 1915.

1,249,566.

Patented Dec. 11, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

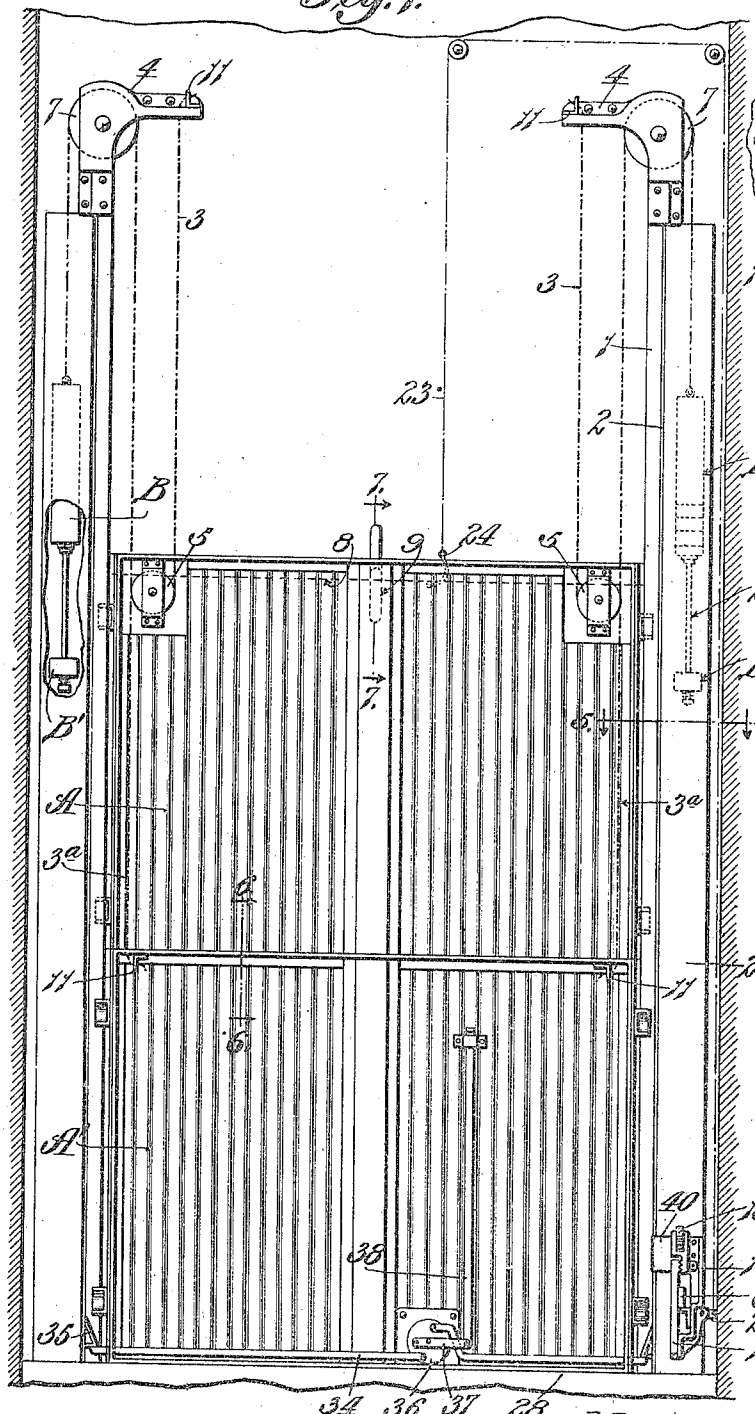


Fig. 2.

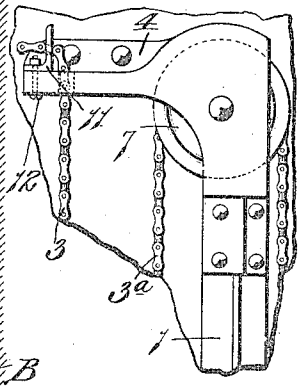


Fig. 3.

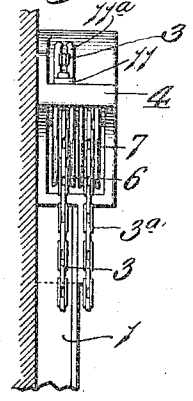
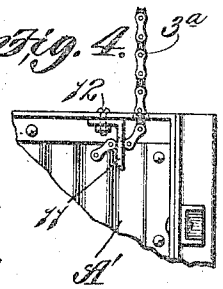


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

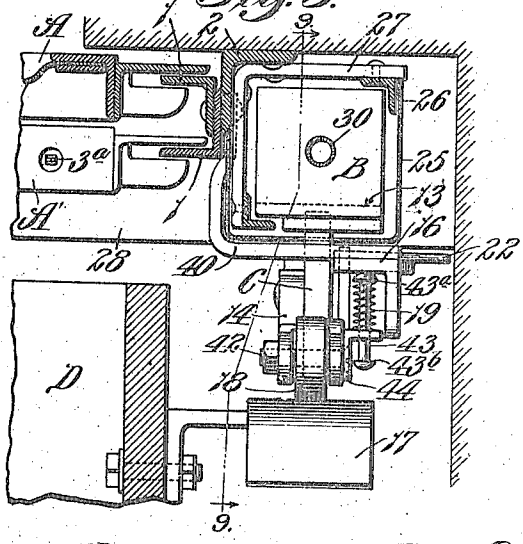


Fig. 6.

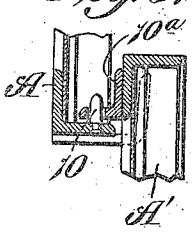


Fig. 7.

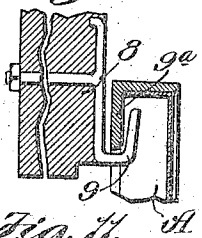


Fig. 8.

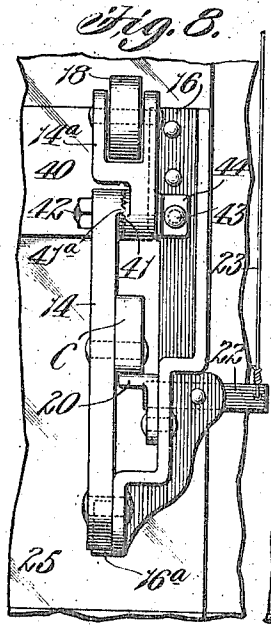


Fig. 9.

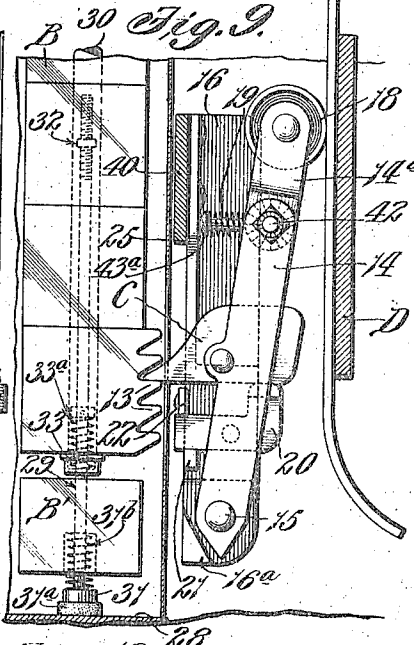


Fig. 11.

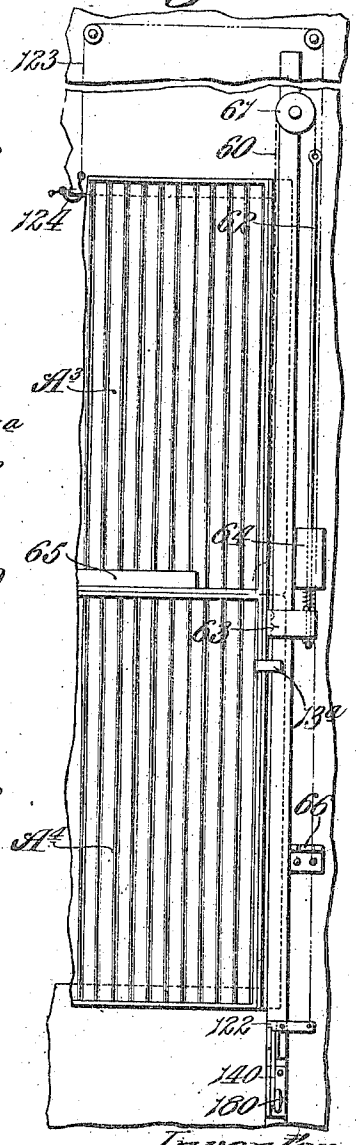


Fig. 10.

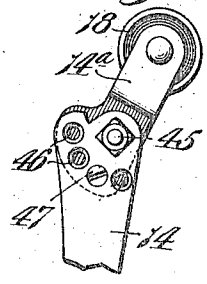


Fig. 12.

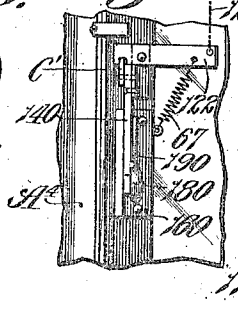
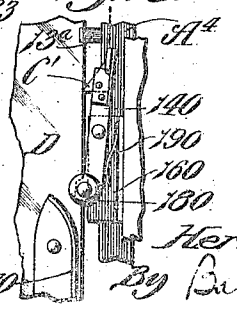


Fig. 13.



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UNITED STATES PATENT OFFICE.

HERMAN C. WALDMAN, OF ST. LOUIS, MISSOURI.

FIRE-DOOR.

1,249,566. Specification of Letters Patent. Patented Dec. 11, 1917.

Application filed November 20, 1915. Serial No. 62,669.

To all whom it may concern:

Be it known that I, HERMAN C. WALDMAN, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Fire-Doors, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to fire doors, and has for one of its objects to provide an elevator shaft fire door of novel construction that will close automatically when the elevator car moves away from the door opening and also when the temperature in proximity to the door opening reaches a certain degree, as, for example, when a fire starts in the elevator shaft or in the room in which the door opening is located.

Another object is to provide a fire door that comprises a locking means of novel construction for holding the door in its open position and a counterbalancing mechanism for the door which is so designed that the door will start to move into its closed position as soon as it is released from said locking device.

Another object is to provide a locking mechanism for fire doors which comprises a locking device that is held in engagement with the part with which it coöperates, when the door is locked, by means of a temperature governed means, the mechanism being so constructed that if a fire starts in proximity to the door, the locking device will be moved into an inoperative position, thus releasing the door, by the pressure exerted on said locking device by the part with which it coöperates.

And still another object is to provide an elevator shaft fire door that comprises a locking mechanism of novel design for holding the door in its open position, means for causing the door to move automatically to its closed position as soon as it is released from said locking mechanism, means for rendering said locking mechanism inoperative in case a fire starts in proximity to the door when the door is open or whenever an actuating device that coöperates with said locking mechanism is operated, and means for automatically locking the door when it reaches its closed position.

Other objects and desirable features of my invention will be hereinafter pointed out.

I have herein illustrated my invention embodied in two types of fire doors, one consisting of a compound slide-up door provided with two horizontally divided sections that move in the same direction and the other consisting of a counter-balanced door provided with two horizontally divided sections that move in opposite directions when the door is operated. I wish it to be understood, however, that certain features of my present invention are not limited to fire doors of the particular type herein illustrated, but, on the contrary, are applicable to any type of fire door, irrespective of the particular construction of the door proper or of the mechanism for opening and closing the door.

Figure 1 of the drawings is an elevational view of a compound slide-up elevator shaft fire door constructed in accordance with my invention.

Fig. 2 is a detail side elevational view of part of the counterbalancing mechanism.

Fig. 3 is a view of the parts shown in Fig. 2, taken at right angles to Fig. 2, for the purpose of clearly illustrating the construction of the clips to which the upper ends of the weight chains are connected.

Fig. 4 is a detail side elevational view, showing the clips on the lower section of the door to which the weight chains are connected.

Fig. 5 is an enlarged cross-sectional view taken on the line 5—5 of Fig. 1.

Fig. 6 is a vertical sectional view taken on the line 6—6 of Fig. 1.

Fig. 7 is a vertical sectional view taken on the line 7—7 of Fig. 1.

Fig. 8 is an enlarged front elevational view of the mechanism for locking the door in its open position.

Fig. 9 is a side elevational view of said locking mechanism taken on the line 9—9 of Fig. 5.

Fig. 10 is a detail side elevational view illustrating another way of forming the operating lever of said locking mechanism.

Fig. 11 is an elevational view, showing part of a counterbalanced door constructed in accordance with my invention.

Fig. 12 is a front elevational view of the locking mechanism employed in the door shown in Fig. 11 for holding the door in its open position; and

Fig. 13 is a side elevational view of the locking mechanism shown in Fig. 12.

Referring to Fig. 1 of the drawings,

which illustrates one form of my invention, A and A′ designate the top and bottom sections, respectively, of a compound slide-up door that is arranged on the inside of an elevator shaft, as shown in Fig. 1, said sections being arranged in different vertical planes and being guided vertically by vertically-disposed tracks 1 shown in Fig. 5 which are preferably mounted on angle bars 2 that are connected to the front wall of the elevator shaft. The two sections of the door are combined with a counterbalancing mechanism comprising chains and weights arranged in such a manner that both sections of the door will move upwardly simultaneously, but at different speeds, when the bottom section of the door is raised, the counterbalancing mechanism herein shown consisting of two chains, or other suitable flexible members 3, connected to stationary brackets 4 on the upper ends of the angle bars 2 and leading downwardly from said brackets under sheaves 5 on the top section A of the door, thence upwardly over sheaves 6 rotatably mounted on the brackets 4, thence downwardly from said sheaves 6 to weights B, to which said chains are securely connected. Chains 3^a lead from the weights B upwardly over sheaves 7 on the brackets 4, and thence downwardly to the bottom section A′ of the door, the lower ends of the chains 3^a being preferably connected to the upper edge portion of the bottom section A′ of the door. When the bottom section of the door is raised the top section will start to move upwardly, but at approximately one-half the speed of the bottom section, the two sections A and A′ coming to rest at about the same time in parallel relation to each other above the lintel that extends across the top of the door opening. The lintel 8 is provided with a binder 9 that coöperates with a depending flange 9^a at the upper edge of the top section A of the door, so as to prevent said top sections from springing away from the lintel when the door is closed, and the meeting edges of the two sections of the door are held securely together when the door is closed by means of a projection 10 on one of said sections that projects into an opening in a device 10^a on the other section, as shown in Fig. 6. A door of the construction above described, which is commercially known as a compound slide-up door, has long been in use, and is illustrated and described in my prior Patent No. 1,034,848, dated August 6, 1912.

As shown in Figs. 1, 2 and 3, each of the brackets 4 is provided with a clip 11 that is provided with a base portion and with a vertically-disposed, bifurcated portion 11^a. The base portion is connected to the bracket 3 by a bolt 12 or in any other suitable manner, and the bifurcated portion 11^a is adapted to receive one of the narrow links of the chain 3, the two side parts of said bifurcated portion 11^a being bent toward each other at their upper ends, as shown in Fig. 3, after the narrow link of the chain has been arranged between same, so as to prevent the chain from becoming detached from the clip 11. The lower ends of the chains 3^a are connected to the bottom section A′ of the door by clips 11 of similar design, as shown in Fig. 4.

As previously stated, one object of my present invention is to provide a fire door which comprises a mechanism for locking the door in its open position. The door shown in Fig. 1 is provided with a locking mechanism that consists of a locking device C that is adapted to engage teeth 13 on one of the weights B of the counterbalancing mechanism when the door is in its open position, or, in other words, after the top and bottom sections of the door have reached their upper limit of movement. It is immaterial, however, so far as my broad idea is concerned, what the locking device C coöperates with, so long as it engages a part that moves with the door. The locking device C is mounted on an operating lever 14 whose lower end is pivotally connected at 15 to a stationary supporting member 16 that is arranged on the inside of the elevator shaft in such a position that the teeth 13 on the weight B will be positioned opposite the locking device C when the top and bottom sections of the door are at their upper limit of travel. Any suitable means may be employed for moving the locking device C into and out of engagement with the part with which it coöperates, but I prefer to provide the elevator car D that travels vertically in the elevator shaft with a shoe 17, shown in Figs. 5 and 9, that engages a roller 18 on the operating lever 14 when the elevator car reaches the door opening, and thus automatically shifts the operating lever 14 into such a position that the locking device C thereon will engage one of the teeth 13 on the weight B in case the door is opened while the elevator car is standing at the opening which the door closes. When the elevator car moves away from the door opening, either upwardly or downwardly, a spring 19 or other suitable means that is combined with the operating lever 14 moves said lever in such a direction that the locking device C thereon is disengaged from the weight B, thereby releasing the door and permitting it to close automatically in a manner hereinafter described. In other words, the door shown in Fig. 1 is so constructed that the movement of the elevator car is utilized to automatically render the locking device C operative or arrange said device in such a position that it will automatically engage the part with which it co-

operates, in case the door is opened while the elevator car is standing at rest at the opening in the elevator shaft for which the door forms a closure, the movement of the car away from the door opening causing the locking device C to be rendered inoperative automatically so as to release the door. The locking device C is pivotally mounted on the operating lever 14 and a stop 20 is provided for limiting the movement of the locking device C in one direction with relation to the lever 14 and preventing said device from moving accidentally out of engagement with the weight B after said weight has come to rest. No means is provided for limiting the movement of the locking device C in the opposite direction with relation to the lever 14, however, and consequently, said device is free to swing on its pivot sufficiently to permit the lower end of the weight B to travel past same, in case said weight is so adjusted that the device C will be positioned opposite one of the intermediate teeth 13 on said weight when the door is fully opened. The stop 20 is mounted on the supporting member 16 in such a manner that it will shift automatically into such a position that the locking device C will move out of engagement with the weight B, and thus release the door whenever the temperature in proximity to the door reaches a certain degree, as, for example, when a fire starts in the elevator shaft or in the room in which the door opening is located. Normally, the movable stop 20 is held in engagement with a stationary abutment 21 on the stationary supporting member 16 by means of a pivotally mounted latch 22 on the member 16 that extends transversely across one end of the stop 20, as shown clearly in Figs. 8 and 9. Said latch 22 is connected by means of a wire or cable 23 to a fusible link 24 that is fastened to the wall of the elevator shaft, preferably to the lintel that extends across the upper edge of the door opening. It will thus be seen that when the locking device C is operative for holding the door in its open position, said locking device is maintained in an operative condition by means of the stop 20, which, in turn, is locked by the latch 22, which is joined to the fusible link 24. In case a fire starts when the elevator car is standing at the door opening with the door in its raised or open position, the heat will melt the link 24, or cause said link to break, thereby taking the strain off the latch 22, permitting the stop 20 to swing downwardly and causing the locking device C to move out of engagement with the weight B, due to the pressure which said weight exerts on the locking device in a direction tending to swing the inner end of same upwardly. As soon as the weight B is released the door starts to move to its closed position. I am aware of the fact that locking mechanisms for fire doors have heretofore been devised in which the locking device is rendered inoperative automatically, in case a fire starts in proximity to the door, but in all of such locking mechanisms with which I am familiar a spring is employed for causing the locking device to be disengaged from the part with which it coöperates. In my improved locking mechanism the pressure which the locking device C is subjected to by the part with which it coöperates when the door is locked, namely, the weight B, is what causes said locking device to release the door when the fuse link breaks. Consequently, there is no liability of my locking mechanism failing to release the door in case a fire starts, as is apt to occur in a locking mechanism equipped with a spring for effecting the disengagement of the locking device from the part with which it cooperates.

In order that the door will start to move automatically into its closed position as soon as the locking device C is rendered inoperative, either by movement of the elevator car away from the door opening, or by breaking of the fusible link 24, I have constructed the counterbalancing mechanism in such a manner that the weight of the door is greater than the load or weight that the weights B exert on the door, when the door is in its open position. When the door starts to move from its closed into its open position the two sections of the door are approximately counterbalanced by the weights B, thus requiring very little power or pressure to open the door. This approximate balancing of the door sections and the weights B of the counterbalancing mechanism is maintained until the door is nearly open. Thereafter, the pressure or pull that the weights B exert on the sections A and A′ of the door is reduced so that by the time the door reaches its open position and is locked by the device C, the combined weight of the top and bottom sections of the door is greater than the combined pull or pressure that the two weights B exert on the door. I accomplish this by providing the weights B with shiftable portions B′ that are so arranged that they will come to rest and be supported by a means separate and distinct from the weights B before said weights B reach their limit of movement during the operation of opening the door. The weights B slide vertically in weight housings 25 that extend longitudinally of the vertically-disposed tracks 1, each of said weight housings preferably being provided with two vertically-disposed guides 26 arranged diametrically opposite each other, as shown in Fig. 5, that embrace oppositely-disposed corners of the weight B arranged between same, said weight being rectangularly-shaped in

cross section and the guides B being angularly-shaped in cross section. The guides 26 can be formed conveniently from angle bars that are held in position by horizontally-disposed straps or supporting members 27 connected to the uprights 2 that carry the door guides or tracks 1. The outer wall of the weight housing 25 is preferably formed from a strip of sheet metal bent in the form shown in Fig. 5 and connected at one edge to one of the weight guides 26 and at its opposite end to the upright 2, said housing being substantially channel-shaped in cross section and extending upwardly from the lower edge of the door opening to a point in proximity to the bracket 4 that carries the sheaves 6 and 7 of the door operating mechanism. The sill 28 of the door projects laterally under the two weight housings 25 and acts as a bottom for said weight housing, as shown in Figs. 1 and 9. Each of the shiftable weights B′ is suspended from its coöperating weight B by means of a rod 29 that projects upwardly through a vertically-disposed pipe 30 in the weight B. At the lower end of the rod 29 is a head or abutment 31 which is preferably provided with a resilient buffer 31^a, as shown in Fig. 9. A coiled expansion spring 31^b is arranged between the head 31 on the rod 29 and the weight B′, and at the upper end of said rod 29 is a stop 32 which is preferably adjustably mounted on said rod. When the door is closed, as shown in Fig. 1, each of the weights B′ is arranged some distance below its coöperating weight B, said weight B′ being maintained in this position by the rod 29 whose stop 32 rests upon a supporting shoulder formed by a collar 33 at the lower end of the pipe 30. When the weights B move downwardly, due to the upward movement of the top and bottom sections of the door, the lower ends of the rods 29 come in contact with the sill 28 before the sections of the door reach their upward limit of travel, and thus cause the weights B′ to come to rest before the weights B reach their downward limit of movement, the rods 29 telescoping in the tubes or pipes 30 in the weights B. When the two sections of the door move upwardly, the weights B′ come to rest before the door sections have reached their upper limit of travel, thus causing only the weights B, which weigh less than said door sections, to act upon said sections. The momentum of the door sections is sufficient, however, to compensate for the excess weight of the door sections and cause said sections to move upwardly into their fully open position. When the locking device C is rendered inoperative in either of the manners previously described, the weights B start to move upwardly and the sections of the door start to move downwardly, owing to the fact that said door sections are heavier than the weights B. After the weights B have moved upwardly a certain distance the collars 33 on the lower ends of the tubes 30 in said weights come in contact with the stops 32 on the rods 29, and thus cause the weights B′ to be picked up, or, in other words, to move upwardly with the weights B, the momentum of the two sections A and A′ of the door being sufficient to overcome the weights B′, and thus insuring the sections of the door moving downwardly to their closed positions, even though the sections of the door and the weights B and B′ are now approximately counterbalanced or of approximately the same weight.

The auxiliary weights B′ of the counterbalancing mechanism tend to check the downward movement of the door after said auxiliary weights have been picked up by the weights B, and consequently, said auxiliary weights B′ operate in practically the same manner as a brake to prevent the two sections of the door from coming to rest with a sudden shock or jar. By changing the position of the adjustable stops 32 on the rods 29 that support the auxiliary weights B′, the downward movement of the two sections of the door can be accurately controlled, owing to the fact that when said stops 32 are at the extreme upper ends of the rods 29, the door will move downwardly a greater distance before the weights B′ are picked up, and consequently, will attain greater momentum than when the stops 32 are arranged some distance below the upper ends of the rods 29. The springs 31^b on which the weights B′ rest and the resilient buffers 31^a on the lower ends of the rods 29 cushion the shock on said weights and rods during the opening movement of the door, and said springs 31^b also cushion the shocks on the weights B′ when said weights are picked up by the weights B during the closing movement of the door. A spring 33^a is preferably arranged between the stop 32 and the collar 33 to absorb the shock on said stop when it is picked up by said collar. When the door reaches its closed position it is locked automatically by a locking mechanism which is preferably so arranged that it can be operated only from the interior of the elevator shaft. The door shown in Fig. 1 is provided with a gravity-operated mechanism for locking the door in its closed position, which mechanism consists of two horizontally-disposed latch rods 34 on the bottom section A of the door that coöperate with stationary lugs or abutments 35 arranged adjacent the door sill 28, as shown in Fig. 1. Said latch rods are pivotally connected at their inner ends to an oscillating member 36 on the bottom section of the door that is provided with an arm 37 to which an operating bar 38 is connected. The weight of the operating bar 38 normally holds the

member 36 in such a position that the latch bars 34 project laterally from the side edges of the bottom section of the door into the path of the stationary stops 35. Said stops are provided with inclined faces, as shown in Fig. 1, and consequently, when the bottom section of the door moves downwardly, the latch bars 34 will ride over the inclined faces on the stops 35 and then spring laterally underneath said stops when the door reaches its closed position, thereby automatically locking the door closed. It will, of course, be understood that various other means could be employed for automatically locking the door in its closed position, but I prefer to equip the door with a gravity-operated locking mechanism of the construction above described, on account of its simplicity and efficiency.

It is immaterial, so far as my broad idea is concerned, how the auxiliary weights B′ are combined with the weights B of the counterbalancing mechanism, so long as said elements are connected together in such a manner that the door and the weights of the counterbalancing mechanism will be approximately counterbalanced when the door starts to move into its open position and will be thrown out of balance automatically prior to the completion of the opening movement of the door so that the door will be heavier than said weights when it is completely opened, and consequently, will start automatically to move to its closed position as soon as the locking device C is rendered inoperative. The stationary supporting member 16 on which the operating lever 14 is mounted preferably consists of a casting arranged adjacent the lower end of one of the weight housings 25 on the outside of same and supported by a strap or band 40 which extends across said housing, as shown in Fig. 5, and is connected to one of the vertically-disposed uprights 2, as shown in Fig. 5. Said supporting member 16 is provided at its lower end with a stop 16^a, shown in Fig. 9, that coöperates with the lower end of the operating lever 14 to limit the outward movement of said lever, and the roller 18 on the upper end of said lever is preferably mounted in such a manner that it can be adjusted toward and away from the shoe 17 on the elevator car D, so as to insure proper coöperation of said shoe and roller without going to the trouble and expense of changing the adjustment of the shoe 17 or the adjustment of the stationary supporting member 16 that carries the operating lever 14. In the form of my invention illustrated in Figs. 8 and 9 the operating lever 14 is provided at its upper end with an adjustable portion 14^a equipped with a toothed or serrated part 41 that coöperates with a toothed or serrated part 41^a on the lever 14, as shown in Fig. 8, said adjustable portion 14^a being held in adjusted position, or in other words, secured to the lever 14 by means of a bolt 42 that passes through the serrated parts of said elements. The spring 19 that moves the operating lever 14 outwardly after the shoe 17 on the elevator car has passed out of engagement with the roller 18 is mounted on a guiding plunger 43 between a head 43^a on said plunger and a stop 44 that is secured to the adjustable portion 14^a of the operating lever by the bolt 42. Said guiding plunger 43 is provided at its opposite end with a head 43^b, shown in Fig. 5, that strikes against the stop 44 after the shoe on the elevator car has released the operating lever 14. Another convenient way of forming the operating lever 14 is illustrated in Fig. 10, wherein the adjustable roller-carrying portion 14^a is pivotally connected at 45 to the upper end of the lever 14 and said parts are provided with coöperating holes 46 through which a retaining pin or bolt 47 can be inserted, so as to hold the roller-carrying portion 14^a of the operating lever in adjusted position, the coöperating holes 46 in said parts being spaced in such a manner that a very delicate adjustment is provided for the portion 14^a.

An elevator fire door of the construction above described eliminates the possibility of fire gaining headway in a building, by failure of the elevator operator to close the door when a fire starts, owing to the fact that the door is normally locked by the gravity-operated locking mechanism on the bottom section of the door and is provided with a counterbalancing mechanism which is so designed that the door will close automatically when the elevator car moves away from the door opening, either upwardly or downwardly, and also when a fire starts while the elevator car is standing at the door opening. The door can be opened as easily as the ordinary compound slide-up door now in use, but it has the added advantage of closing automatically when the elevator car moves away from the door opening and also when a fire starts while the elevator car is standing at the door opening. While I prefer to equip the elevator car with a shoe or other suitable means for rendering the locking device C operative or putting it in such a condition that it will automatically engage the part of the counterbalancing mechanism with which it coöperates when the door reaches its extreme open position, I do not wish it to be understood that my broad idea is limited to a fire door constructed in this exact manner, for it is immaterial what means are employed for rendering the locking device C operative. Furthermore, while I prefer to equip the locking mechanism with a fusible link or other suitable means for causing the door to be released automatically, in case a fire starts, it will, of course,

be understood that this feature could be omitted, if desired. I prefer to have the locking device C coöperate with one of the weights of the counterbalancing mechanism, but this also is not essential, so long as said locking device is so arranged that it will cooperate with some part of the structure to lock the door in its open position.

In Figs. 11, 12 and 13 I have illustrated a counterbalanced elevator shaft fire door constructed in accordance with my invention, in which the door is composed of two horizontally divided sections A^3 and A^4 that move in opposite directions when the door is operated. Chains or other suitable flexible devices 60 that are connected to the top section A^3 of the door lead upwardly over sheaves 61, and thence downwardly to rods 62 that are connected to laterally-projecting brackets 63 on the bottom section A^4 of the door, as shown in Fig. 11. Only one of the chains 60 and rods 62 is shown in Fig. 11, but it will, of course, be understood that said elements are duplicated at the opposite side edge of the door. Each of the rods 62 is equipped with a weight 64, and the top section A^3 of the door is provided with a counterbalancing weight 65, or, in other words, is made heavy enough so that it will be of approximately the same weight as the bottom section A^4 of the door and the weight 64 on the rod 62. When the door is moved into its open position by raising the top section or depressing the bottom section, the weight 64 will move downwardly with the rod 62 until said weight comes in contact with a stationary abutment 66 arranged in the path of travel of said weight on any suitable stationary portion of the structure. The momentum of the two sections of the door is sufficient to carry both sections to their extreme limit of movement, notwithstanding the fact that the top section A^3 of the door is then slightly heavier than the bottom section of the door, owing to the fact that the weight of the bottom section was reduced automatically when the weight 64 came in contact with the stationary weight-supporting member 66. When the door reaches its extreme open position a locking device C′ that is pivotally mounted on an operating lever 140, as shown in Fig. 13, snaps into position over a lug 13^a on the bottom section A^4 of the door, and thus prevents either section from moving back to its closed position until said locking device C′ is tripped or rendered inoperative. The operating lever 140 is carried by a stationary supporting member 160 and is provided at its lower end with a roller 180 that cooperates with a shoe 170 on the elevator car, said shoe being so arranged that the operating lever 140 will be moved automatically into such a position that the locking device C′ will be rendered operative when the elevator car approaches the door opening. When the elevator car moves away from the door opening in either direction, a spring 190 that coöperates with the operating lever 140, will cause the locking device C′ to move automatically into an inoperative position, and thus release the bottom section A^4 of the door. Both sections of the door will thereupon start to move into their closed position, owing to the fact that the top section A^3 of the door is heavier than the bottom section. After the bottom section has moved upwardly a certain distance the arm or laterally-projecting bracket 63 thereon will pick up the weight 64 that was resting on the stationary supporting member 66 and will thus cause the movement of both sections of the door to be checked sufficiently to cause said sections to come to rest in their closed position without a sudden jar or shock, the weight 64 being so arranged that it will not be picked up until after the two sections of the door have gained sufficient momentum to carry them home to their closed position. In order that the door will close automatically, in case a fire starts when the elevator car is standing at the door opening with the door in its open position, I have provided the locking mechanism with a latch 122 that limits the movement of the locking device C′ in one direction in practically the same manner as the locking latch 22 of the structure illustrated in Figs. 8 and 9, said locking latch 122 being connected by means of a wire or cable 123 to a fusible link 124 secured to the lintel of the door opening or to any other suitable stationary part of the elevator shaft. The locking device C′ is mounted on the operating lever 140 in such a manner that it is free to swing in one direction, and thus permit the laterally-projecting lug or stop 13^a on the bottom section of the door to pass same when the door is being opened, but the locking latch 122 is so arranged that it will prevent said locking device C′ from swinging in the opposite direction after the lug 13^a has engaged the underside of said locking device. When the fusible link 124 breaks a spring 67, which is connected to the latch 122, causes said latch to move automatically into such a position that the locking device C′ is rendered inoperative with respect to the part 13^a on the door with which it coöperates, thus permitting the door to start to move automatically into its closed position.

I have not herein illustrated my invention embodied in a one-piece door or in a rolling shutter, but it will, of course, be obvious that the invention could be applied to fire doors of the type just mentioned, therefore, I do not wish it to be understood that my invention is limited to horizontally divided fire doors or to compound slide-up doors and counterbalanced doors, for one feature of

my invention consists in providing an elevator fire door with means whereby the door will close automatically when the elevator car moves away from the door opening and also whenever a fire starts while the door is open and the elevator car is standing at the door opening. Another feature of my invention consists in providing a fire door with mechanism for locking the door in its open position, and a counterbalancing mechanism designed in such a manner that the door will start to close automatically as soon as it is released from said locking mechanism, and so far as this feature is concerned, it is immaterial whether or not the locking mechanism is rendered operative automatically by a shoe on the elevator car and comprises means for causing the door to be released automatically from said locking mechanism, in case a fire starts. The particular details of construction of the various elements of the complete door are immaterial, and while I have herein illustrated and described types of locking mechanisms that can be applied successfully to compound slide-up fire doors and counterbalanced fire doors, it will, of course, be understood that various other means could be employed for accomplishing the results previously described without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is:

1. In a fire door, a locking mechanism comprising a shiftable element provided with a pivotally mounted locking device, a part that coöperates with said device to lock the door, means for moving said element so as to carry the locking device thereon into and out of operative position with relation to said part, a movable stop arranged so that it will engage said locking device when said shiftable element moves in one direction and hold said device in operative engagement with said part, a latch for locking said stop, and a temperature governed means combined with said latch for holding said latch in operative engagement with said stop.

2. In a fire door, a locking mechanism comprising a shiftable element, a supporting structure on which said element is mounted, a movable locking device on said shiftable element, a part with which said locking device coöperates, a movable stop on said supporting structure for holding said locking device in operative position with relation to said part, and a latch on said supporting structure combined with a temperature governed means for preventing said stop from moving into a position to release said locking device.

3. In a fire door, a locking mechanism comprising a shiftable element, a supporting structure on which said element is mounted, a pivotally mounted locking device on said element that is free to swing in one direction, a part that coöperates with said locking device to lock the door, a stop on said supporting structure for preventing said locking device from swinging in the opposite direction when it is engaged with said part, and a temperature governed means for resisting movement of said stop in one direction when it is engaged by said locking device.

4. In a fire door, a locking mechanism comprising a shiftable element, a supporting structure on which said element is mounted, a pivotally mounted locking device on said element that is free to swing in one direction, a part that coöperates with said locking device to lock the door, a pivotally mounted stop on said supporting structure that prevents said locking device from swinging in the opposite direction when it is engaged with said part, an abutment on said structure against which said stop bears, a latch for holding said stop in engagement with said abutment, and a temperature governed means for preventing said latch from moving.

5. In a fire door, a locking mechanism comprising a lever, an actuating means for said lever, an adjustable extension on one end of said lever that coöperates with said actuating means, a traveling part, a locking device that coöperates with said part and which is mounted on the lever in such a manner that it will swing in one direction when engaged by said traveling part, and a temperature governed means for preventing said locking device from swinging in the opposite direction when said traveling part is at rest and engaged by said locking device.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this third day of May 1915.

HERMAN C. WALDMAN.

Witnesses:

WELLS L. CHURCH,

GEORGE BAKEWELL.