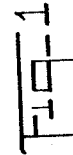


Filed Oct. 20, 1966

3,438,147

Sheet 1 of 5



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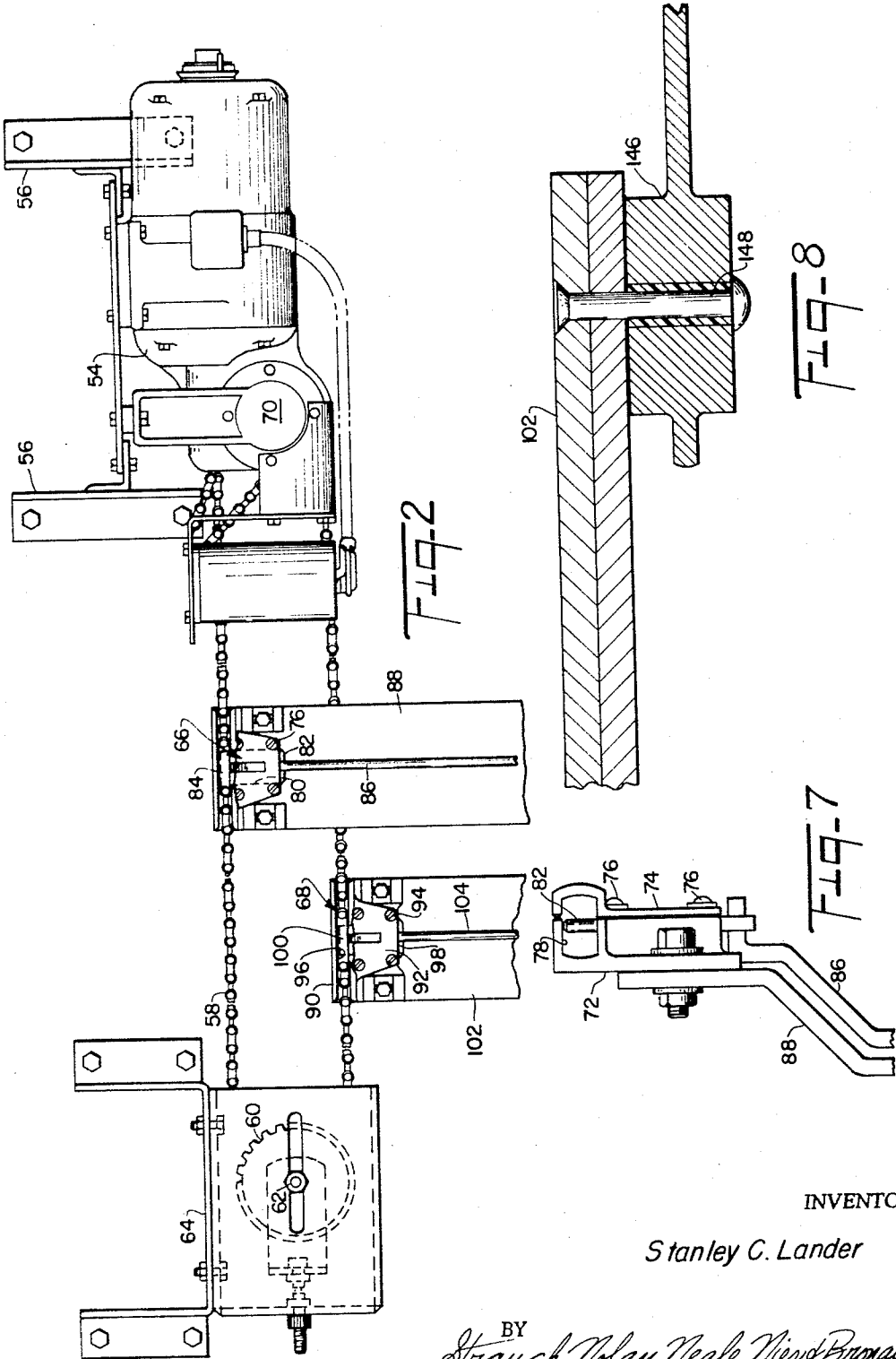
April 15, 1969

S. C. LANDER
DISCONNECT FOR DOORS

3,438,147

Filed Oct. 20, 1966

Sheet 2 of 5



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3,438,147

DISCONNECT FOR DOORS

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Sheet 3 of 5

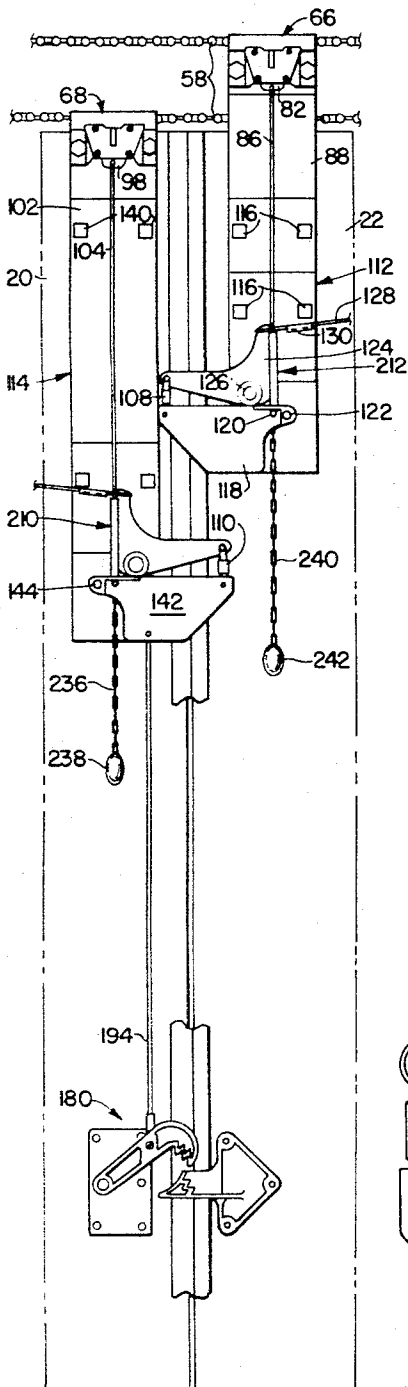


FIG. 3

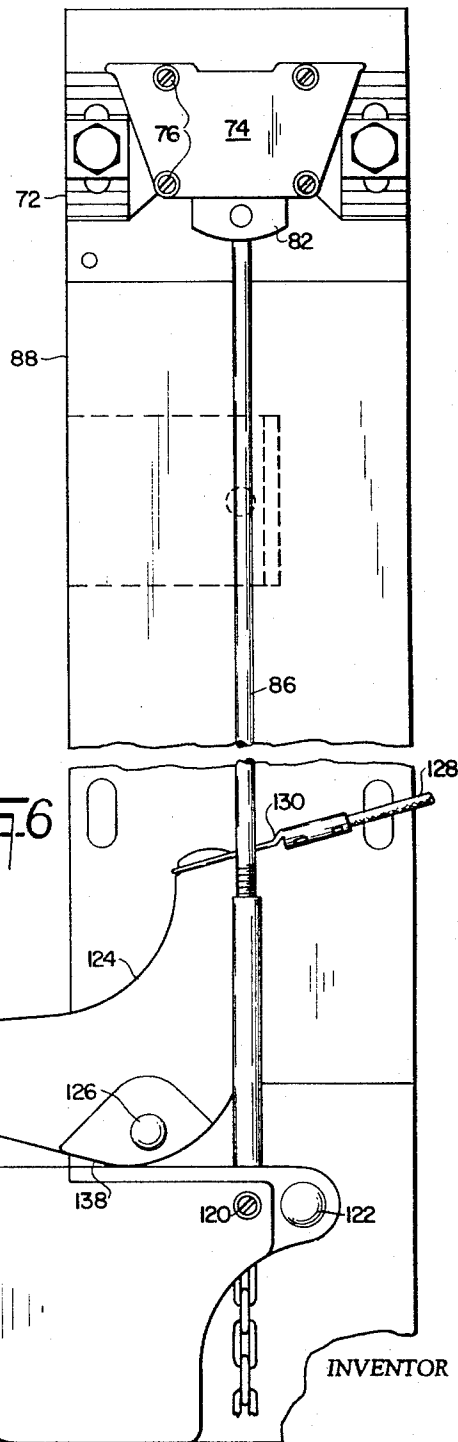


FIG. 6

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Sheet 5 of 5

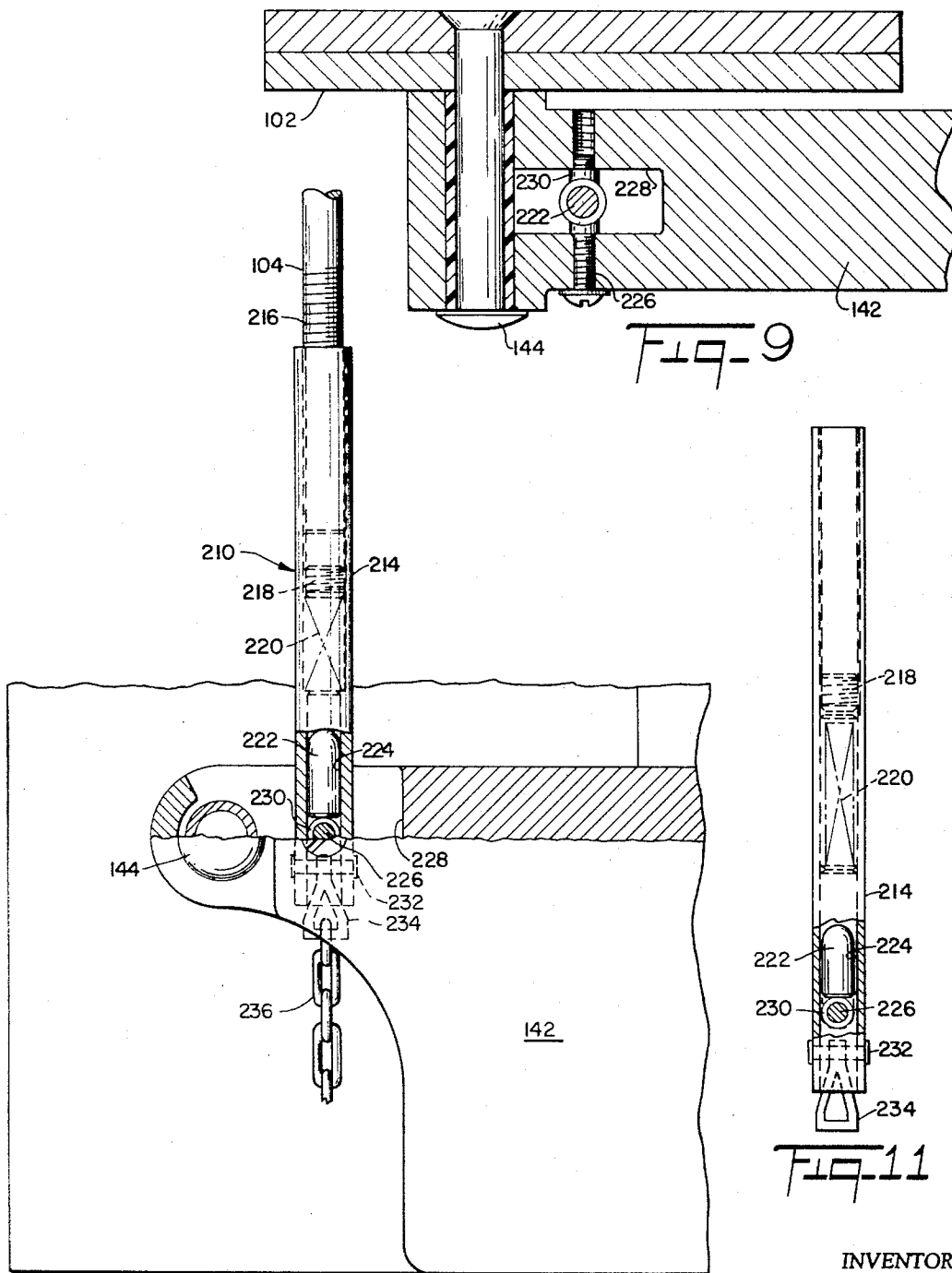


Fig-10

Fig-11

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3,438,147

DISCONNECT FOR DOORS

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Int. Cl. E05f 15/20, 17/00

U.S. Cl. 49—7

18 Claims

ABSTRACT OF THE DISCLOSURE

An automatic disconnect assembly for gravity closing, motor operated fire doors in the form of an integrated sub-assembly which can be assembled and adjusted prior to installation upon the door.

Background of invention

The present invention relates to improvements in automatically released motor operated fire doors.

Examples of prior structures of this general type will be found in United States Patent 3,166,155 issued Jan. 19, 1965, to H. B. Clark for "Motor Operated Fire Doors With Automatic Door Release."

Summary of the invention

The principal object of the present invention is to provide an improved automatic disconnect assembly for motor operated gravity closed fire doors in which the door mounted portion of the disconnect mechanism, the door mounted combustion responsive element and the means biasing the door mounted portion of the disconnect mechanism to disconnected position are arranged in an integrated sub-assembly which can be assembled and adjusted prior to installation upon the fire door.

A further object of the present invention is to provide an improved automatic disconnect assembly for gravity biased motor operated fire doors which is effective to automatically latch the fire door in its closed position when moved to its closed position by gravity following release from its motor drive in response to combustion.

A further object of this invention is to provide an improved automatic disconnect arrangement for bi-parting gravity biased fire doors which is operative to release the doors from their motor operator upon actuation of any of a plurality of fusible links, one located on each of the doors adjacent the opening and one located in fixed relation immediately above the center of the opening.

Brief description of the drawings

These and other objects of the present invention will become more fully apparent by reference to the appended claims and as the following detailed description proceeds in reference to the accompanying drawings wherein:

FIGURE 1 illustrates the application of the present invention to motor operated level top bi-parting doors mounted on a box track;

FIGURE 2 is a fragmentary view illustrating the motor drive for the bi-parting door of FIGURE 1;

FIGURE 3 is an enlarged view of the disconnect mechanism and latch structure of the arrangement illustrated in FIGURE 1;

FIGURE 4 is a further enlarged fragmentary view of the disconnect mechanism and latch structure on the left-hand door of the structure of FIGURE 1;

FIGURE 5 is a right side elevational view of the structure illustrated in FIGURE 4;

FIGURE 6 is an enlarged fragmentary view of the disconnect mechanism mounted on the right-hand door of the assembly of FIGURE 1;

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FIGURE 7 is a fragmentary left side elevational view of the upper end of the structure illustrated in FIGURE 6;

FIGURE 8 is a fragmentary sectional view taken along the line 8—8 of FIGURE 4;

FIGURE 9 is a fragmentary sectional view taken along the line 9—9 of FIGURE 4;

FIGURE 10 is an enlarged fragmentary view partially in section showing the interconnection between the weight arm and the linkage rod tube assembly of the structure of FIGURE 4; and

FIGURE 11 is a view showing the details of the linkage rod tube assembly of the structure of FIGURE 4.

Preferred embodiment

Referring now in detail to the drawings and particularly to FIGURE 1, there is there illustrated a pair of fire doors 20 and 22 mounted for convergent movement along a horizontal box track 24 to their closed position as illustrated and divergent movement to open position under the control of a motor drive mechanism 26. As is conventional, the doors are biased by gravity to their closed positions. For this purpose, door 20 is connected through a cable 28 secured thereto at 30 to a weight 32, cable 28 being entrained over one pair of coaxial pulleys indicated at 34 journaled on a shaft 36 fixed to a mounting plate 38 attached to the wall 40. Similarly door 22 is biased to its closed position by a weight 42 connected to door 22 by a cable 44 connected to door 22 at 46 and entrained over a pulley 48 journaled on a shaft 50 fixed to a mounting plate 52 attached to the wall 40. Weights 32 and 42 thus bias doors 20 and 22 toward their closed positions along the wall 40 as illustrated in FIGURE 1.

The motor drive 26 is best illustrated in FIGURE 2. It comprises a motor drive unit 54 embodying an electric motor and a speed reduction drive train including an output sprocket (not shown). Unit 54 is mounted on the wall 40 by mounting brackets 56. The output sprocket for the drive unit 54 is in continuous driving engagement with a chain 58. At its opposite end chain 58 is entrained upon the sprocket 60 journaled on a shaft 62 adjustably mounted upon a mounting bracket 64 fixed to the wall 40. The upper run of the chain 58 is connected to the door 22 by a disconnect mechanism 66 and the lower run of the chain 58 is connected to the door 20 by a disconnect mechanism 68. When the motor drive unit 54 rotates its output sprocket in a counterclockwise direction about the axis 70, the upper run of the chain 58 and the disconnect mechanism 66 drive connected thereto will move to the left as viewed in FIGURES 1 and 2 to move the door 22 to its closed position as shown in FIGURE 1 and the lower run of the chain 58 and the disconnect mechanism 68 connected thereto will move to the right to move the door 20 to its closed position as illustrated in FIGURE 1. When the motor of the motor drive unit 54 is reversed to move the output sprocket in a clockwise direction about the shaft 70 as viewed in FIGURE 2 the upper run of the chain 58 will move to the right and the lower run to the left to move the disconnect mechanism 66 and 68 to the right and left respectively to move the doors 22 and 20 to the right and left respectively to their open positions.

The disconnect mechanisms 66 and 68 are essentially identical. Their structure is best illustrated by reference to FIGURES 2 and 7. They comprise a pair of coating parts 72 and 74 fixed together by screw 76 and defining therebetween a through opening 78 through which the chain 58 extends. The parts 72 and 74 define a guide-way 80 (best shown in FIGURE 2) extending perpendicular to the through opening 78 and in which is reciprocally mounted a bolt 82. As is apparent from FIG-

FIGURE 7, when the bolt 82 is in its uppermost position its top end abuts the top wall of the through opening 78. This bolt 82 extends through the opening of an elongated link 84 in the upper run of the chain 58 to establish a positive drive connection between the upper run of the chain 58 and the disconnect mechanism 66. The position of the bolt 82 is controlled by a connecting rod 86 connected to the lower end thereof and extending downwardly therefrom. Part 72 is bolted to a mounting plate 88 which is secured to the door 22 as will be explained presently.

The disconnect mechanism 68 similarly comprises a pair of cooperating parts 90 and 92 secured together by screws 94 defining a through channel or opening 96 through which the lower run of the chain 58 extends and defining a guideway in which is reciprocably mounted a bolt 98 for driving or clutching engagement with an elongated link 100 in the lower run of the chain 58. Part 90 is bolted to mounting plate 102 secured to the door 20 in the manner that will be described presently. The position of bolt 98 is controlled by a connecting rod 104 which is connected thereto in the same manner that connecting rod 86 is connected to bolt 82.

From the foregoing it is apparent that the bolt 82 and the elongated link 84 define a positive clutch by which the door 22 may be selectively drive connected to the upper run of the chain 58 and the bolt 98 and elongated link 100 define a positive clutch whereby the door 20 may be selectively drive connected to the lower run of the chain 58. Normally these clutches are engaged so that when the upper run of the chain 58 moves to the left and the lower run moves to the right under control of the motor drive unit 54 the doors 20 and 22 are moved to their closed position as shown in FIGURE 1. Conversely with these clutches engaged, when the motor drive unit 54 is driven to move the upper run of the chain 58 to the right and the lower run of the chain 58 to the left the doors 20 and 22 are moved to their open positions.

The present invention provides a novel arrangement whereby each door is under the control of a pair of combustion responsive elements one located over the center of the doorway and the other located on the edge of the door overlapping the doorway when the door is in its open position. In the embodiment illustrated in FIGURE 1, there being two doors 20 and 22, there are a total of three combustion responsive elements designated 106, 108 and 110. When any of these three combustion responsive elements detects the presence of combustion, the doors 20 and 22 will be released from their connection to the drive chain 58 by the disconnect mechanisms 66 and 68 and allowed to close under the influence of the weights 32 and 42 respectively.

Referring now to FIGURE 3, the disconnect mechanism 66 is a part of a disconnect assembly 112 and the disconnect mechanism 68 is part of a disconnect mechanism 114. The disconnect assembly 112 includes the mounting plate 88 which is secured to the door 22 by bolts 116. The depending connecting rod 86 is connected at its lower end to a weight 118 at 120. Weight 118 is pivotally mounted upon the plate 88 at 122 so that the weight 118 normally tends to move in a counterclockwise direction about the axis of the pivot 122 and through its pivotal connection at 120 to the rod 86 to pull the rod 86 and the bolt 82 downwardly to disconnect the door 22 from the upper run of the chain 58. Weight 118 is normally held in its position as shown in FIGURE 3 through the action of a bell crank 124 pivotally mounted on the plate 88 on pivot shaft 126, a rope 128 having a loop 130 hooked over and upwardly extending arm of the bell crank 124 as is best shown in FIGURE 6, and the combustion responsive element 108 which is pivotally connected at its opposite ends at 132 and 134 (FIGURE 6) to the weight 118 and bell crank 124 respectively. Combustion responsive element 108 is a fusible link which when subjected to sufficient heat fuses

and separates into two parts, one connected to the weight 118 and the other connected to the bell crank 124. By this construction, so long as the combustion responsive element 108 remains in tact, the weight 118 is held in its upper position (as shown in FIGURES 3 and 6) with its top surface 136 abutting the bottom surface 138 of the bell crank 124. When the combustion responsive element 108 fuses, the weight 118 drops in a counterclockwise direction about its pivot 122 and the bell crank 124 pivots in a clockwise direction about its pivot 126 under the influence of the tension applied to it through rope 128 and the eye connection 130. After a predetermined motion of the bell crank 124 in a clockwise direction about its pivot 126, the eye connection 130 slips off of the upper arm of the bell crank 124 allowing it to restore in a counterclockwise direction under the influence of its own weight.

As the weight 118 drops in a counter clockwise direction about its pivot 122, it pulls the connecting rod 86 and the bolt 82 downwardly with respect to the mounting plate 88 to disengage from the link 84 (FIGURE 2) and thereby release the door 22 from the upper run of the chain 58.

The manner in which tension is maintained on the rope 128 will be explained presently.

The structure of the disconnect assembly 114 on the door 20 is best illustrated in FIGURES 3, 4 and 5. Essentially it is very similar to the disconnect assembly 112. The disconnect mechanism 68 including the bolt 98 controlled by the connecting rod 104 is mounted at the upper end of the mounting or base plate 102. The plate 102 is secured to the door 20 by bolts 140 (FIGURE 3). On the lower end of the mounting plate 102 a weight 142 is pivotally mounted upon pivot shaft 144. Weight 142 is normally supported in its elevated position as shown in FIGURES 3 and 4 by a bell crank 146 pivotally mounted on the base plate 102 upon the pivot stud 148 and connected to the weight 142 through the combustion responsive element or fusible link 110 which is pivotally connected to weight 142 at 150 and to bell crank 146 at 152. In its elevated position, the top surface 154 of the weight 142 abuts the bottom surface 156 of the bell crank 146 to limit further movement of the weight 142 and bell crank 146 about their respective pivots 144 and 148 in a counterclockwise direction. Bell crank 146 is biased in a counterclockwise direction about its pivot 148 by a tension applied through a rope 158 connected to the upwardly extending arm of the bell crank 146 through an eye connector 160.

Upon fusion of the combustion responsive element 110 it will separate into two parts thereby permitting weight 142 to drop in a clockwise direction about its pivot 144 and the bell crank 146 to pivot in a counterclockwise direction about its pivot 148 sufficiently to disengage its upper arm from the eye connector 160 and to thereafter restore in a clockwise direction about the pivot 148 under the influence of its own weight.

The manner in which tension is maintained upon the ropes 128 and 158 is best illustrated in FIGURE 1. The rope 128 extends to the right from bell crank 124 over one of the pair of pulleys 34 back across the top of the doors 22 and 20, passing between the mounting plates 88 and 102 and the surfaces of the doors 22 and 20 upon which they are mounted over one of a pair of pulleys 160 journaled about an axis 162 and over a pulley 164 which is supported by the rope 128 and from which is suspended a series of weights 166. The rope 158 extends over the other of the pair of pulleys 160 and joins the rope 128 at the pulley 164. In other words, what has hereinabove been described as independent ropes 128 and 158 are in fact the opposite ends of but a single rope. The pulleys 160 are journaled about the axis 162 upon a bracket 168 which is hung from the hook end of a trigger lever 170 pivotally mounted upon the bracket 52 at 172. The other end of the trigger lever 170 is held in position by a rope 174 ex-

tending from the lever 170 to one end of a combustion responsive element 106. The combustion responsive element 106 is a fusible link like the elements 108 and 110. Its opposite end is fixed to the wall 40 at 176. The fusible link or combustion responsive element 106 is positioned directly above the opening through the wall 40. When the doors 20 and 22 are in their open positions, the fusible links 110 and 108 will project into that opening. If fusible link 106 fuses first, the trigger lever 170 will pivot in a counterclockwise direction about its pivot 172 dropping the bracket 168 and the pulleys 160 under the influence of the weights 166. Dropping of the pulley 160 and the bracket 168 upon which they are mounted releases the tension in the rope 128-158. Release of the tension in the rope 128-158 permits the bell cranks 124 and 146 and the weights 118 and 142 to pivot about their axes in counterclockwise and clockwise directions respectively under the influence of their weights to pull the connecting rods 86 and 104 downwardly and disengage the bolts 82 and 98 from the upper and lower runs of the chain 58 (see also FIGURE 3). Upon disengagement of the bolts 82 and 98 of the disconnect mechanism 66 and 68 in this manner movement of the doors 20 and 22 is no longer constrained by the position of the chain 58 and the doors 20 and 22 will be closed under the influence of the weights 32 and 42 acting through the chains 28 and 44 respectively.

Similarly, if either of the combustion responsive elements 108 or 110 is actuated to sever the connection between weight 118 and bell crank 124 or between weight 142 and bell crank 146, tension in the rope 128-158 will be relieved. If the combustion responsive element or fusible link which severs is 110, weight 142 will pivot in a clockwise direction and bell crank 146 in a counterclockwise direction until it is disengaged from the rope portion 158 and the disconnect mechanism 68 will thereby be disengaged. Upon release of tension in the rope portion 158 there will be a corresponding release in tension in the rope portion 128 thereby permitting bell crank 124 and weight 118 to pivot in a clockwise direction about their respective pivot axes to disengage the disconnect mechanism 66. If the fusible link 108 is that which is severed, the reverse will occur. In either event both disconnect mechanism 66 and 68 will be disengaged from the upper and lower runs of the chain 58 respectively to permit the doors 22 and 20 to close under the influence of the weights 42 and 32.

Associated with the disconnect mechanism 68 is a latch mechanism 180. The latch mechanism 180 comprises a mounting plate 182 (see also FIGURE 4), a latch 184 pivotally mounted at 186 upon the mounting plate 182 and a keeper 188. The mounting plate 182 is mounted on the door 20 by bolts 190 and the keeper 180 is mounted on the door 22 by bolts 192. So long as the weight 142 of the disconnect assembly 114 remains in its elevated position, latch 184 is held in its elevated position through the connection formed by connecting rod 194 pivotally connected to latch 184 at 196 and to the weight 142 at 198. When the weight 142 drops upon release of the tension in the rope portion 158 or upon severance of the fusible link 110, the latch 184 drops to a lower position established by stop pin 199 in which its arcuate surface 200 is disposed in alignment with the arcuate surface 202 of the keeper 188. As the doors 20 and 22 come together, the arcuate surface will engage the arcuate surface 200 of the latch 184 and cam the latch 184 upwardly to pass over the top of the arcuate surface 202 and drop into engagement so that the teeth 204 of the latch 184 engage the teeth 206 of the keeper 188 and lock the two doors 20 and 22 together. The doors can be opened merely by lifting the latch 184 to pivot it in a counterclockwise direction about its pivot 186 if it becomes necessary to open the doors 20 and 22, but assuring that the doors 20 and 22 will not be inadvertently reopened following closure under the influence of one of the combustion responsive elements 106, 108 or 110. If but a single door is used, the keeper 188 can be mounted on the wall 40 at the limit of

closure movement of the door. As is apparent, the latch mechanism 180 may if desired be eliminated entirely. As shown in the drawing there is a threaded connection between the two halves of the rod 194 so that upon installation of the disconnect assembly 114 and the latch mechanism 108 upon the door 20, the normal elevated position of the latch 184 can be adjusted and thereby compensate for any minor misalignments which may occur in installation.

At times it becomes necessary to move the doors 20 and 22 independently of the drive chain 58 and it is desirable that this be possible without interfering with the connections to the fusible elements 106, 108 and 110 providing for automatic door closure in the event of a fire. This is provided for in the present invention by the provision of a novel linkage rod tube assembly 210 and a similar assembly 212 at the connection between the rod 104 and the weight 142 and at the connection between the rod 86 and the weight 118 (see FIGURE 3). The detail construction of these assemblies 210 and 212 is illustrated for the assembly 210 between the rod 104 and the weight 142 in FIGURES 9, 10 and 11. The assembly 210 comprises a tube 214 threadedly received at its upper end on the lower threaded end 216 of the rod 104, a plug 218 threadedly mounted internally of the bore of the tube 214, a compression spring 220 abutting at its upper end the lower end of the plug 218, and a further plug 222 axially slidably mounted within the bore of the tube 214 and abutting at its upper end the bottom of the compression spring 220. As is apparent in FIGURE 10, the lower end of the plug 222 is visible through a pair of aligned elongated apertures 224 through the wall of the tube 214. Referring to FIGURES 9 and 10, a screw 226 is mounted in the weight 142 and extends through and bridges the space defined by a central opening 228 in the weight 142. Within this base 228, screw 226 is surrounded by a cylindrical sleeve 230. Screw 226 and sleeve 232 extend through the elongated aperture 224 in the lower end of the tube 214. The slidable plug 222 bears upon the top of the sleeve 230 and the bottom end of the elongated aperture 224 bears against the bottom of the sleeve 230. By this construction, so long as the weight 142 is in its elevated position, the rod 104 and the bolt 98 are resiliently supported in their elevated positions but upon release of the weight 142, the weight 142 acts directly through the screw 226 and sleeve 230 to pull the assembly 210 and the rod 104 downwardly to disengage the disconnect mechanism 68.

Referring to FIGURE 11, within the opening 228 the tube 214 has a transverse diametral pin 232 fixed thereto beneath the bottom of the opening 224 and a chain link 234 is pivotally mounted thereon within the lower end of the bore of the tube 214. The link 234 is connected, as is best illustrated in FIGURE 3 to a chain 236 and weighted handle 238. By pulling upon the weighted handle 238, the rod 104 and bolt 98 can be lowered to disengage the disconnect mechanism 68 without disturbing the position of the weights 142 and 118 so that the door 20 can be moved back and forth independently of the position of the chain 58.

The linkage rod tube assembly 212 is of identical construction to the assembly 210 and has depending therefrom a chain 240 and weight handle 242 so that by pulling upon the handle 242 the rod 86 and the bolt 82 can be pulled down to disengage the bolt 82 from the upper run of the chain 58 and thereby permit movement of the door 22 independently of the chain 118 and 142 so that upon release of the handle 242 with the door 22 in its original position, the drive connection to the chain 58 through the disconnect mechanism is reestablished.

As is apparent the present invention is not limited to the illustrated embodiment. For example, it is applicable to single doors, to a door or doors mounted on an inclined track or tracks, to bar tracks etc., an important feature being that it can be used with most existing motor operated fire doors without any material modification of the existing structure.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof.

What is claimed and desired to be secured by Letters Patent is:

1. In combination with a wall having a door opening therein:

- (a) a mounting track to be secured on such wall adjacent the door opening;
- (b) a door movable on said track between open and closed positions and biased toward its closed position;
- (c) a motor and a connection between it and said door for opening and closing the door including two separable parts that are normally connected to each other to move together in both of opposite directions to open and close the door under control of said motor;
- (d) one of said parts being drive connected to and normally driven by said motor alternatively in opposite directions along a predetermined path;
- (e) the other of said parts being carried by said door;
- (f) automatic means including:

(1) at least one combustion responsive element and

(2) a second means connected to said other of said parts of said connection and to said element to separate said parts upon response of said element to combustion in the vicinity of said combustion responsive element and thereby completely disconnect the door from the motor and permit gravity closure thereof;

(g) the improvement comprising a unitary base structure mounted on said door and means mounting thereon:

(1) the said other part of said connection;

(2) the said one combustion responsive element; and

(3) the said second means;

whereby the interrelation thereof can be established prior to mounting upon said door.

2. The combination defined in claim 1 wherein said track is substantially horizontal above said door opening and wherein said door is gravity biased toward its closed position by a weight, pulley and cable arrangement in which the pulley is mounted in said wall, the cable is fixed to said door at one end, entrained over said pulley and fixed to said weight at the other end.

3. The combination defined in claim 1 wherein said second means is a weight eccentrically pivotally mounted upon said unitary base structure and so connected to said other part that said other part is disengaged from said one part in the gravity determined position of said pivoted weight.

4. The combination defined in claim 3 wherein said automatic means further comprises a link pivotally mounted on said unitary base structure and wherein said combustion responsive element is connected between said pivoted link and said weight.

5. The combination defined in claim 4 wherein said link and weight have coacting abutting surfaces which, when engaged, establish the upward limit of travel of said weight.

6. The combination defined in claim 4 wherein said automatic means further comprises a cable-pulley-weight arrangement for maintaining said link pivoted to a position in which said weight is maintained at the upward limit of its travel, the pulley being mounted on said wall, the cable being connected at one end to said link entrained over said pulley and operatively connected to said weight of said arrangement whereby said weight of said arrangement is effective through said cable, said link and said combustion responsive element to maintain said weight on said base structure in its elevated position so long as said combination responsive element is intact.

7. The combination defined in claim 6 wherein said link is a bell crank,

8. The combination defined in claim 3 further comprising a latch pivotally mounted on said door, a keeper disposed at the end of the path of travel of said latch during closing movement of said door and operative when engaged by said latch to prevent inadvertent opening of said door, and means interconnecting said latch and said pivotally mounted weight to permit engagement of said latch with said keeper only when said pivotally mounted weight is in its gravity determined position.

9. The combination defined in claim 6 wherein the connection between the cable of said arrangement and said link is a separable connection automatically disconnected incident to severance of said combustion responsive element whereby said door is freed of the influence of the weight of said arrangement.

10. The combination defined in claim 1, wherein the interconnection between said second means and said other part comprises a limited slip mechanism operable to permit disengagement of said other part from said one part without movement of said second means so that said door can be moved independently of said motor connected one part and including a pair of relatively slidably interconnected elements one pivotally connected to said one part and the other pivotally connected to said second means, said elements being relatively slidable between predetermined limits and having resilient means associated therewith biasing said elements to the one of their limits of relative motion in which said other part is maintained in engagement with said one part so long as said second means remains in its normal position.

11. In combination with a wall having a door opening therein:

(a) a mounting track to be secured on such wall above the door opening;

(b) a pair of doors movable on said track between divergent open and convergent closed positions and biased toward their convergent closed positions;

(c) a motor and a connection between it and said doors for opening and closing the doors including for each door a positive clutch having two separable parts that are normally connected to each other to move together in both of opposite directions to open and close the associated door under control of said motor;

(d) one of said parts of each of said clutches being drive connected to and normally driven by said motor alternatively in opposite directions along a predetermined path;

(e) the other of said parts of each of said clutches being carried by the associated one of said doors;

(f) automatic means including for each door:

(1) at least one combustion responsive element; and

(2) a second means connected to said other of said clutch parts and to said element to separate said clutch parts upon response of either of said elements to combustion in the vicinity of said combustion responsive element and thereby completely disconnect the doors from the motor and permit gravity closure thereof.

12. The combination defined in claim 15 further comprising a unitary base structure mounted on each of said doors and means for each of said doors mounting on the unitary base structure thereon the said other clutch part, the said one combustion responsive element, and the said second means whereby the interrelation thereof can be established prior to mounting upon the associate door.

13. The combination defined in claim 12 wherein said second means are weights eccentrically pivotally mounted upon the associated one of said unitary base structures and so connected to the associated one of said other clutch parts that said other clutch parts are disengaged from said one clutch parts in the gravity determined positions of said pivoted weights.

14. The combination defined in claim 13 wherein said automatic means further comprises for each door a link pivotally mounted on the associated one of said unitary base structures and wherein the associated one of said combustion responsive elements is connected between said pivoted link and said weight.

15. The combination defined in claim 14 wherein said links and weights have coacting abutting surfaces which, when engaged, establish the upward limits of travel of said weights.

16. The combination defined in claim 14 wherein said automatic means further comprises a cable-pulley-weight arrangement for maintaining said links pivoted to a position in which said weights are maintained at the upward limits of travel, the pulleys being mounted on such wall, the cable being connected at its opposite ends to said links, entrained over said pulley and suspending said weight of said arrangement whereby said weight of said arrangement is effective through said cable, said links and said combustion responsive elements to maintain said weights on said base structures in elevated positions so long as both of said combustion responsive elements are in tact.

17. The combination defined in claim 13 further comprising a latch pivotally mounted on one of said doors, a keeper mounted on the other of said doors and disposed

at the end of the path of travel of said latch during closing movement of said door and operative when engaged by said latch to prevent inadvertent opening of said doors, and means interconnecting said latch and said pivotally mounted weight on said one door to permit engagement of said latch with said keeper only when said pivotally mounted weight is in its gravity determined position.

18. The combination defined in claim 16 wherein the connections between the cable of said arrangement and said links are a separable connection automatically disconnected incident to severance of either of said combustion responsive element whereby said doors are freed of the influence of the weight of said arrangement.

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U.S. Cl. X.R.

49—5, 139, 118, 123, 379

U.S. DEPARTMENT OF COMMERCE

PATENT OFFICE

Washington, D.C. 20231

**UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION**

Patent No. 3,438,147

April 15, 1969

Stanley C. Lander

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 25, after "one" insert -- of a --. Column 6, line 40, "aprture" should read -- aperture --. Column 8, line 61, claim reference numeral "15" should read -- 11 --.

Signed and sealed this 7th day of April 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, J

Commissioner of Patent