

May 27, 1969

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3,445,963

PANIC BREAKAWAY BALANCE DOOR

Filed July 21, 1967

Sheet 1 of 2

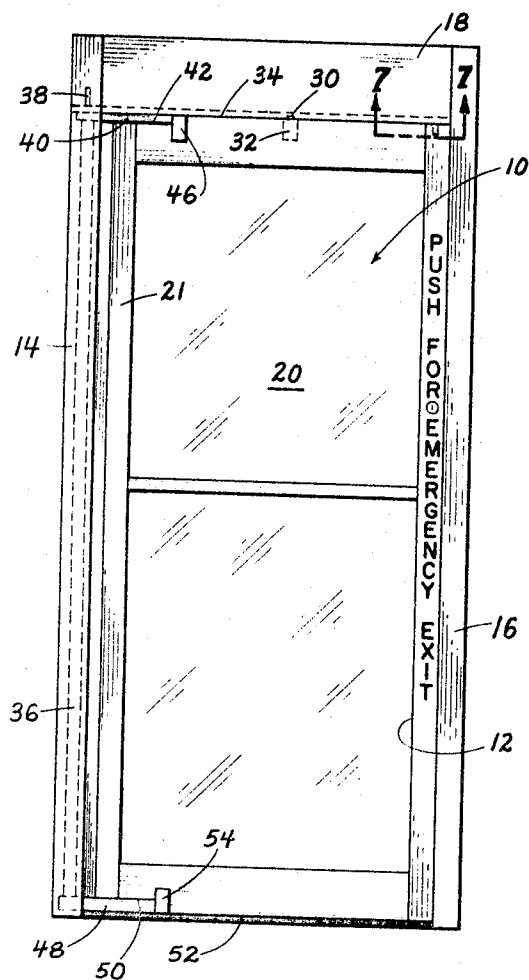


Fig. 1

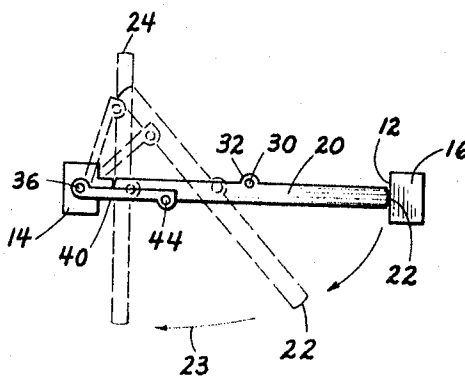


Fig. 2

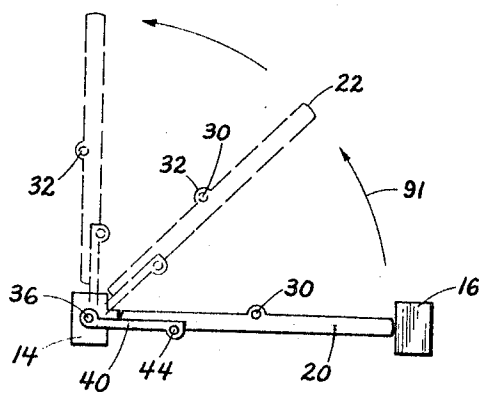


Fig. 3

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Sheet 2 of 2

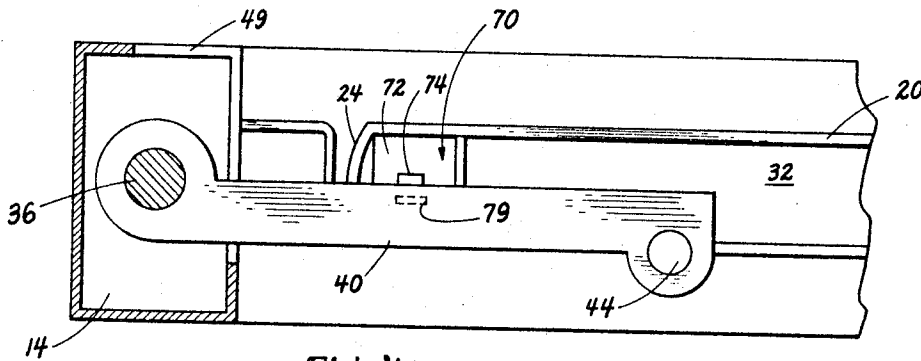


Fig. 4

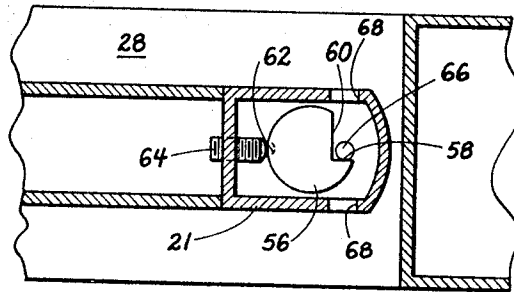


Fig. 7

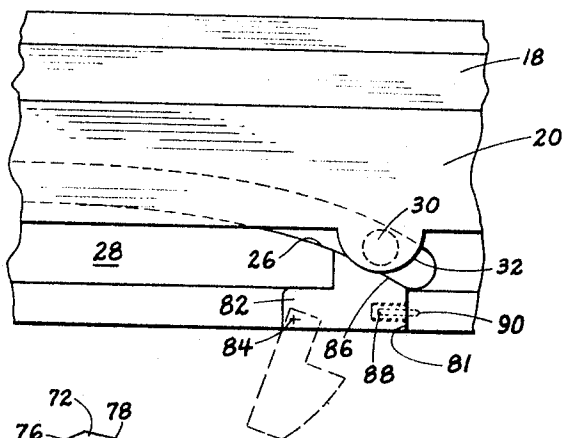


Fig. 6

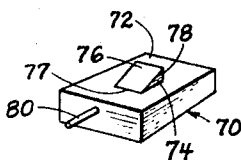


Fig. 5

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3,445,963

PANIC BREAKAWAY BALANCE DOOR
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U.S. Cl. 49—141

11 Claims

ABSTRACT OF THE DISCLOSURE

A balanced door structure having panic breakaway features whereby the normal balanced operation of the door during opening may be altered in emergency situations to a conventional pivotal action about a vertical pivot axis extending along one side edge of the door. Manual pressure against the face of the door in a direction opposite from the normal opening direction thereof brings the breakaway action elements into operation for overcoming the normal balanced type opening of the door and providing for the conventional pivotal opening thereof.

This invention relates to improvements in balanced door structures and more particularly, but not by way of limitation, to an automatic balanced door structure having breakaway features permitting full opening of the door in a conventional pivotal opening action in emergency conditions, or the like.

Balanced door structures are in widespread use today in both manual and automatic operation type installations. A balanced door leaf is normally provided with a vertical pivot axis of rotation which is off-set from the vertical edge of the door leaf. As the door is pivoted about the off-set vertical axis, the pivot mechanism normally rides in an elongated guide or slot whereby the door moves sideways or laterally simultaneous with the rotation thereof. Thus, as one portion or substantial half-section of the door leaf swings inwardly, the other half-portion thereof swings outwardly whereby the load requirements for either manual or automatic operation of the door are greatly reduced. The combined rotational and sliding action provided by the off-set pivot mechanism and guide opens the door leaf against the door jamb in such a manner that approximately half of the door leaf extends inwardly from the door jamb and the opposite half of the door leaf extends outwardly therefrom. Of course, the exact positioning of the door between the inward and outward faces of the door jamb is determined by the position of the off-set vertical axis with respect to the centerline of the door. However, it is usually desirable to position the pivot axis with respect to the centerline of the door leaf whereby the door leaf is substantially perpendicular to and centered within the door way in the fully opened position thereof.

Balanced doors of this type are utilized in both manually operated and automatically operated installations. The doors normally open in one direction only and in manual installations pressure against the opening edge in one direction will open the door, whereas pulling the opening edge in the opposite direction will open the door, as is well known. Automatically operated doors are usually actuated by remote means such as an electric eye, an electronic wave impulse, or a switch-type mate which initiates the opening of the door upon being interrupted or activated by a person approaching the door from one direction only. In most normal installations and under normal operating conditions, the balanced door operation is extremely desirable for several reasons. The ease of opening of the door facilitates both the manual and automatic operation thereof, and the fact that the projection of the door

to either the outside or inside of the door opening may be maintained at a minimum, thus reducing interference of the door with persons approaching the door from either direction. However, in the open position of the door, the door leaf is disposed within the door opening, and thus the width of the door opening may be somewhat less than the door opening in the full opened position of a more conventional type pivotal door having the pivot axis along one side edge thereof. In addition, the fact that the balanced doors normally open in one direction only may be a detriment under emergency conditions when it is necessary to move traffic rapidly through the door in a direction opposite from the normal opening and traffic flow direction therethrough. As a result, it is considered important to provide means whereby the use of the full width of the door opening may be utilized and the door may be readily opened from the reverse direction in emergency conditions, or the like, to facilitate the movement or flow of traffic through the opening.

The present invention contemplates a novel balanced door structure provided with complementary and coacting breakaway features whereby the door will readily open in a conventional pivotal action about one side edge thereof when manual pressure is applied against one face of the door leaf. The door operating structure is generally similar to that disclosed in my co-pending application Ser. No. 448,945, filed Apr. 19, 1965, and entitled "Two-Way Automatic Door." Of course, whereas the door disclosed in the pending application includes a pair of coacting door leaves hung within a single doorway or door opening, the present invention relates to a balanced door installation wherein either a single door leaf or any desired number of leaves may be provided in the doorway. The novel breakaway features include a latch member cooperating between the door leaf and the pivot mechanism whereby the door and pivot arm are automatically locked together upon the application of pressure against the door leaf from a direction opposite to the normal opening direction thereof. The locked engagement between the pivot arm and door causes the door leaf to cease any rotation about the off-set vertical axis, and begin to rotate about a vertical axis disposed in the proximity of the vertical side edge of the door.

Substantially simultaneously with the alteration of the pivotal action of the door, a breakaway block element provided in the upper door frame or lintel is engaged by the pivot pin. The pressure of the pivot pin against the breakaway block overcomes a spring urged latch member whereby the block is released to open a passageway through which the pivot pin may pass as the door leaf is pivoted about the newly established vertical axis.

Of course, a door stop is provided for limiting the rotation of the door in one direction during the normal balanced door operation, as is well known. However, the door stop mechanism of the present invention is so designed and constructed that the application of pressure against the door leaf in a direction opposite the normal balanced opening operation overcomes a resilient or spring urged latch member and releases the engagement between the door leaf and the stop member whereby the door may be readily opened in the said opposite direction. Thus, the three breakaway features; namely, the latch mechanism locking the door leaf with the off-set pivot mechanism whereby the door pivot is automatically changed to the vertical axis extending along a side edge of the door; the breakaway block which frees the pivot pin from the guide slot; and the stop member which permits disengagement of the stop with the door leaf upon the opening of the door in the panic or emergency situation.

It is an important object of this invention to provide a novel balanced door structure particularly designed

and constructed for facilitating the opening thereof during emergency situations.

It is another object of this invention to provide a novel balanced door wherein the pivotal axis thereof may be readily altered from the normal off-set position to a position adjacent one vertical side edge of the door.

Another object of this invention is to provide a novel balanced door particularly designed and constructed for quick opening in a direction opposite the normal opening direction thereof in an emergency situation, or the like.

A further object of this invention is to provide a novel balanced door which may be opened in a manner providing a maximum clearance through a door opening in an emergency situation.

Still another object of this invention is to provide a novel balanced door structure having breakaway panic features which is simple and efficient in operation and economical and durable in construction.

Other and further objects and advantageous features of the present invention will hereinafter more fully appear in connection with a detailed description of the drawings in which:

FIGURE 1 is a front elevational view of a balanced door structure embodying the invention.

FIGURE 2 is a plan view of a balanced door embodying the invention with portions depicted in dotted lines to indicate the normal balanced operation thereof.

FIGURE 3 is a view similar to FIGURE 2 with portions shown in dotted lines to indicate the emergency opening action of the door.

FIGURE 4 is an enlarged broken view of a portion of the top of the door illustrating the locking latch mechanism of the invention.

FIGURE 5 is an enlarged perspective view of the locking latch member of the invention.

FIGURE 6 is an enlarged broken view of a portion of the door header or lintel as viewed from the lower edge thereof, with portions shown in dotted lines for purposes of illustration.

FIGURE 7 is an enlarged sectional view taken on line 7—7 of FIGURE 1.

Referring to the drawings in detail, reference character 10 generally indicates a balanced door structure adapted to be disposed in the usual doorway 12 having vertical door jambs 14 and 16 and an upper door frame or lintel 18. The door 10 may be of substantially any desired construction and as depicted herein, comprises a single door leaf 20 having a peripheral frame 22 supporting transparent window portions made of glass or the like.

The door leaf 20 is suspended from the upper frame 18 in a manner as will be hereinafter set forth whereby the leaf rotates and slides along the frame 18 during the opening and closing of the door. As particularly shown in FIGURE 2, the leaf 20 pivots in a clockwise direction upon opening thereof and slides simultaneously along the door lintel 18 in a direction toward the jamb 14. During the opening and closing operation, the outer end 22 of the door leaf 20 moves through an elliptical path indicated by the arrows 23 in FIGURE 2. It will be apparent that the combined pivoting and sliding action of the door leaf 20 results in disposition thereof adjacent the door jamb 14 in such a manner that substantially half of the door section extends on each side of the door jamb. In addition, the path of travel of the end 22 as well as the end 24 of the door leaf 20 is reduced to a minimum distance from the doorway 12 thus decreasing the distance through which the door must travel during the opening thereof. In this manner, the door 10 (particularly in an automatically operated door) may be fully opened and moved to an out-of-the-way position before a person approaching the door has proceeded or traveled through a sufficient distance toward the door to encounter the opening door section. Of course, in a manually operated door the door may be opened with great speed and ease. Furthermore, the door opens to a full 90° posi-

tion against the door jamb 14 for reducing interference with the passage of traffic through the door from either direction.

If the door 10 is to be automatically operated a suitable door operating unit (not shown) may be disposed in the upper door frame 18 above the door leaf 20 for opening and closing the door as will be hereinafter set forth in detail. The door operator may be of any suitable or well known type such as that disclosed in the John C. Catlett Patent No. 3,087,720, issued Apr. 30, 1963 and entitled "Automatic Door Operator" or in the John C. Catlett Patent No. 3,247,617, issued Apr. 26, 1966, and entitled "Two-Way Automatic Door," but is not limited thereto. In combination with some types of door operators a connecting member such as a pin member (not shown) may be carried by the door operator unit and extends downwardly through a slot or elongated opening 26 (shown partially in dotted lines in FIGURE 6) provided in the lower edge or surface 28 of the upper door frame 18. In combination with other types of door operators (and in manual doors) an upwardly extending pin member 30 is carried by a roller 32 (FIGURE 2) provided in the upper edge 34 of the door leaf 20 and extends upwardly into or through the slot 26.

The pin or connecting member (not shown) which is carried by the door operator unit preferably extends downwardly into the door guide roller or pivot member 32 and may be supported therein by a suitable swivel type ball aligning bearing (not shown) as is well known, whereby any abnormal twisting or weight loads can be compensated for as well as elimination of any possible binding or friction that may result in misalignment between the guide roller and pin member. The door guide pivot 32 is suitably installed in the upper edge 34 of the door leaf 20 and is preferably disposed substantially in the lateral center of the leaf 20 whereby rotation of the leaf will be about a centrally disposed vertical axis.

The door operator unit (not shown) is normally suitably electrically connected to a switch mat or the like (not shown) in any well known manner for actuation thereby. Of course, an electric eye device (not shown) or any other suitable remote control actuation apparatus may be utilized for operation of the door motor as is well known. In the event a switch mat is utilized, the mat is activated when a person steps on any portion thereof and the door operator is actuated thereby for opening the door in a manner as will be hereinafter set forth.

Of course, in a manually operated door the door operator may be eliminated. In this instance, the guide member or roller 30 is preferably provided with the upwardly extending pin 34 which extends into or through the slot 26 whereby lateral movement of the pin during opening and closing of the door will be confined to the path or configuration of the groove or slot 26. As shown herein, the groove 26 is of an arcuate configuration generally similar to that shown in my co-pending Ser. No. 448,946, filed Apr. 19, 1965, and entitled "Two-Way Automatic Door." However, it is to be understood that the slot 26 may be also substantially any desired elongated configuration.

A vertical hinge pin or shaft 36 (FIGURE 1) is disposed within the door jamb 14 in any well known manner and is preferably mounted in a pair of spaced ball bearing support members (not shown) for free rotation within the jamb 14 and about its own longitudinal axis. The upper end of the shaft 36 may be provided with a longitudinally extending neck portion 38 adapted for engagement by the door operation for rotation thereby in the automatically operated structures. Of course, the member 38 may be eliminated, if desired, in manually operated doors. An upper hinge arm 40 is secured in the proximity of the upper end of the hinge shaft 36 and extends radially outwardly therefrom into a recess 42 provided in the upper end 32 of the door section 20.

5

A pivot pin 44 is secured to the outer extremity of the hinge arm 40 in any suitable manner and extends downwardly into a suitable bearing support member 46 provided in the door 20 coterminous with the recess 42.

A lower hinge arm 48 is secured in the proximity of the lower end of the hinge shaft 36 and extends radially outwardly therefrom into a groove or recess 50 provided in the lower end 52 of the door section 20. A pivot pin or the like (not shown) may be suitably secured in the recess 50 and extends downwardly into a suitable ball bearing member 54 carried by the lower hinge arm 48. The lower pivot pin (not shown) cooperates with the upper pivot pin 44 for connecting the hinge arms 40 and 48 between the hinge shaft 36 and door leaf 20 for supporting the door leaf and providing an off-set pivot axis for the hinge arms 40 and 48, as well known in balanced door structures of this general type.

A cam member 56 (FIGURE 7) is rotatably secured in the peripheral frame 21 of the door leaf 20 in any suitable manner (not shown) and is preferably disposed near the upper edge 32 thereof and in the proximity of the outer edge or strike 22 thereof. The cam 56 is provided with a substantially L-shaped recess or cut away portion on the outer periphery thereof to provide a pair of substantially perpendicularly disposed shoulders 58 and 60. The cam 56 may also be provided with a detent 62 or the like on the outer periphery thereof for receiving the outer end of a spring urged or yieldable latch member 64 mounted in the door leaf 20 and extending into the peripheral frame 21. The engagement between the latch 64 and detent 62 maintains the cam 56 in a normal position whereby the shoulder 58 engages a downwardly extending pin or stop member 66 secured in the lower surface 28 of the door frame 18 when the door leaf 20 is in a closed position. A recess or groove 68 extends across the top or upper edge 32 of the door leaf 20 to provide clearance for the pin or stop member 66 as the door is opened or closed. Of course, the door leaf 20 may normally be opened from one direction only since the engagement between the pin or stop member 66 and shoulder 58 normally limits the rotation of the door 20 in an opposite or reverse direction from the usual opening direction.

An emergency latch mechanism generally indicated at 70 (FIGURES 4 and 5) is provided in the upper edge of the door leaf 20 and preferably comprises a suitable housing 72 having a spring urged or yieldable latch member 74 mounted therein in any well known manner whereby the latch member 74 normally projects outwardly from the housing 72 through an opening 77 provided therein as particularly shown in FIGURE 5. The portion of the latch 74 which extends outwardly from the housing 72 is preferably of a substantially pyramid shape and comprises one slanted or angularly disposed face 76 coterminous with a substantially straight face 78. Upon the application of sufficient pressure against the slanted face 76, the latch 74 will be depressed into or downwardly within the housing 72 in a manner and for a purpose as will be hereinafter set forth. A reset pin or lever 80 extends outwardly from the housing 72 and is suitably operably connected with the latch 74 in any well known manner (not shown) in order that the lever 80 may be manually engaged for manipulation of the latch member 74. The lever 80 is connected with the spring urged latch 74 in such a manner that the latch 74 may be selectively depressed for resetting of the latch mechanism 70 subsequent to emergency operation of the door 10 as will be hereinafter set forth. An elongated recess or slot 79 (FIGURE 4) is provided on the surface of the arm 40 which is disposed adjacent the upper edge 32 of the door leaf 20. The slot 79 is disposed in substantial alignment with the latch member 74 and in the emergency opening of the door 10 the latch 74 engages the slot 79 for locking the door leaf 20 to the arm 40 whereby movement therebetween will be simultaneous.

6

Referring now to FIGURE 6, an opening or recess 81 is provided in the surface or edge 28 of the door frame 18 for receiving a panic breakaway block 82 therein. The block 82 is pivotally secured within the recess 81 at 84 in any well known manner and may be of substantially any desired configuration. However, as disclosed herein, the block 82 is of a substantially L-shaped configuration with one inwardly disposed edge 86 thereof complementary to the configuration of the side edge of the slot 26 and fills in or forms a portion of the said side edge of the groove 26 as clearly shown in FIGURE 6. A spring urged or yieldable plunger member 88 is carried by the block 82 for engaging and cooperating with a detent 90 provided in the recess 81 for maintaining the block 82 in a normally closed position therein as shown in solid lines in FIGURE 6 whereby the edge 86 completes the side of the groove 26. Upon the application of sufficient pressure against the edge 86, in a manner as will be hereinafter set forth, the yieldable plunger 88 will be released from engagement with the detent 90 for releasing the block 82 from the recess 81 whereby the block may be pivoted outwardly from the door frame 18 to the position shown in dotted lines in FIGURE 6. In the embodiment of the door 10, depicted herein, the guide pin 30 is mounted in the upper edge 34 of the door leaf 20 and extends upwardly into or through the slot 26. The outward pivoting of the block 82 opens a portion of the slot 26 and frame 18 whereby the pin 30 may be released therefrom for emergency opening or operation of the door leaf 20.

Of course, in door structures wherein the guide pin is carried by the door operator and extends downwardly through the slot 26 into communication with the guide roller 32, the panic breakaway block 82 may be similarly mounted in the upper edge 34 of the door leaf 20 to release the pin from engagement with the door and preclude hindrance of the emergency operation of the door.

The arms 40 and 48 extend through suitable openings (only one of which is shown at 49 in FIGURE 4) provided in the door jamb 14 as is well known and as shown in my co-pending application Ser. No. 448,945. The openings extend through a sufficient distance to provide clearance for the pivotal movement of the arms 40 and 48 during the opening and closing of the door leaf 20.

In the normal balanced door opening and closing operation for the door 10 and particularly in the automatic operation thereof, the door operator unit (not shown) is energized by the switch mat (not shown) or other remote control operating device upon the approach of a person desiring to pass through the door opening 12 as is well known. Upon activation or energization the door operator transmits rotation to the vertical pivot axis 36 which pivots or rotates the pivot arms 40 and 48 in one direction of rotation whereby the door leaf 20 is pivoted about the off-set vertical axis determined by the guide pin 30. The pin 30 rotates within the slot 36 and simultaneously slides therein in a direction toward the door jamb 14. The door leaf 20 simultaneously pivots about the off-set vertical axis and moves laterally in a direction toward the door jamb 14, as shown in dotted lines in FIGURE 2. The door remains in the open position until the traffic passing through the door 10 has cleared the opening 12 and has traveled a sufficient distance therebeyond to avoid contact with or interference from the door leaf 20. The door operator then functions to rotate the shaft 36 in an opposite direction for rotation of the arms 40 and 48 in an opposite direction to reverse the rotational and sliding direction of the door leaf 20 for closing thereof.

In a manually operated door, pressure may be applied against the proper face of the door leaf 20 in a proximity of the edge 22 for applying pressure thereagainst in the normal opening direction therefor. The door leaf 20 will thus pivot about the off-set vertical axis determined by the guide pin 30 and the pin 30 will slide along the slot 26 in a direction toward the door jamb 14. The door leaf

22 will simultaneously pivot and move laterally in a direction toward the jamb 14 as shown in dotted lines in FIGURE 2. The rotational and sliding movement of the door causes the arms 40 and 48 to pivot for rotating the shaft 36 in one direction. When the traffic has cleared the doorway or opening 12 and the manual pressure is released from the door latch 20 the shaft 30 is rotated in an opposite direction for reversing the rotation and sliding movement of the door leaf 20 for closing the door. In most manual installations, a spring biased door closer member or the like (not shown) is provided in the door frame 18 (or in the upper portion of the door leaf 20) and suitably connected with the shaft 36 for providing the rotation thereof in said opposite direction. It is also the usual practice to provide check means for the door (in both automatic and manual installations) for retarding or controlling the closing speed of a door for safety purposes. Of course, as set forth in my aforementioned co-pending application Ser. No. 448,945. The arcuate configuration of the slot 26 cooperates with the pin 30 for automatically reducing the closing speed of the door immediately prior to the full closing thereof.

In emergency or panic situations wherein it is desirable or necessary to open the door 10 in a direction opposite from the normal opening direction thereof manual pressure may be exerted against the striker edge or in the proximity of the edge 22 from a reverse direction with respect to the normal opening direction of the door. Upon the application of sufficient pressure in said opposite direction, the stop member 66 engaging the shoulder 58 of the cam 56 will cause the latch 64 to retract whereby the cam 56 will rotate sufficiently to release engagement of the shoulder 58 with the pin 66. Immediately upon the release of the engagement with the stop member 66, the door leaf 20 begins to rotate about the off-set vertical axis established by the guide pin 30 but in a direction opposite to the normal opening direction of the door. This causes the edge 24 of the door to begin moving in a direction toward the arm 40 whereby the lower surface of the arm 40 brushes or rides against the slanted surface 76 of the depressible latch member 74. As soon as the door leaf 20 has rotated through a sufficient distance (which is very slight) to bring the latch 74 into alignment with the slot 79 the latch 74, being constantly urged in an outwardly direction, engages the slot 79 for a positive engagement therewith. This locks the door leaf 20 to the arm 40 and stops the rotation of the door leaf 20 about the off-set axis established by the pin 30. The door leaf 20 and arms 40 and 48 then rotate or pivot simultaneously about the pivot shaft 36 in a direction as indicated by the arrows 91 in FIGURE 3. As soon as the door leaf 20 and pivot arms 40 and 48 begin to pivot about the vertical axis or shaft 36 the guide pin 30 bears against the surface or edge 86 of the breakaway block 82. This pressure overcomes the force of the retractable piston 88 and releases the piston 88 from the groove or recess 90 and continued force of the pin 30 against the edge 86 causes the block 82 to pivot outwardly to the position shown in dotted lines in FIGURE 6. This frees the engagement of the guide pin 30 with the door frame 18 and permits the door leaf 22 to freely move to a full opened position in the manner of a conventional side pivotal door as shown in dotted lines in FIGURE 3. Of course, the recess or groove 68 in the top edge 32 of the door leaf 20 permits the door to pass by the pin or stop member 66 without hindrance to the emergency opening thereof.

When the emergency situation has passed the door may be swung or pivoted in a reverse direction to the closed position shown in solid lines in FIGURE 3. The stop member 66 will engage the shoulder 60 of the cam 56 when the door leaf 20 approaches the full closed position. The engagement of the pin 56 against the shoulder 68 will rotate the cam 56 sufficiently for engaging the spring urged latch 64 in the detent 62 thus resetting the stop mechanism. The breakaway block 82 may be easily re-

turned to the normal latch position thereof by manually rotating the block in a reverse direction about the pivot 48 until the retractable plunger 88 has re-engaged the recess 90. The lever 80 of the latch mechanism 70 may be manually manipulated in a suitable manner for depressing the latch 74 to release the engagement of the latch 74 with the slot 79 whereby the door leaf 20 may be returned to its normal released position with respect to the arm 40.

When the door leaf 20 is closed subsequent to the emergency opening operation the stop member 66 will initially engage the shoulder 60 when the door leaf 20 approaches the full closed position. This will initiate the rotation of the cam 56 but the door leaf 20 will be slightly angularly disposed about the off-set axis 30 with respect to the normal closed position thereof due to the locked engagement of the door leaf 20 with the arm 40 by means of the latch 74. The release of the engagement between the latch 74 and the slot 90 will permit rotating of the door leaf 20 the slight rotational distance necessary for establishing the normal closed position therefor. The distance of this rotation will be limited by the engagement of the latch member 64 with the detent 62 in the cam 56 which resets the stop mechanism in the original position or normal position therefor. When the door has been returned to this normal closed position, the panic breakaway block 82 may be easily returned to the normal closed and latched position thereof as hereinbefore set forth. The door is thus returned to the normal installation for a balanced opening and closing operation.

From the foregoing it will be apparent that the present invention provides a novel balanced door wherein the normal balanced opening thereof may be readily converted to a more conventional swing type opening in an opposite direction from the normal opening direction. The stop means which normally limits the movement of the door leaf in a direction opposite from the normal opening direction is provided with releasable means whereby the stop may be released upon the application of sufficient manual pressure against the strike of the door in said opposite direction. When the stop mechanism has been released, the door leaf and pivot arms are automatically locked together by means of a spring latch member whereby the pivot arms and door leaf swing or rotate simultaneously about a vertical axis disposed in the proximity of the side edge of the door leaf. As the door swings open about the newly established vertical axis, the breakaway block opens for releasing the guide pin from engagement with the guide slot and door frame thus permitting free opening of the door. When the emergency situation has passed, the door may be closed, and the panic release or breakaway features may be readily reset to restore the normal balanced operation to the door. The novel breakaway features are simple and efficient in operation and economical and durable in construction.

Changes may be made in the combination and arrangement of parts as heretofore set forth in the specification and shown in the drawings, it being understood that any modification in the precise embodiment of the invention may be made within the scope of the following claims, without departing from the spirit of the invention.

What is claimed is:

1. A balanced door comprising a door frame, a door leaf mounted in the door frame, said door leaf being provided with an upper off-set hinge arm and a lower off-set hinge arm, each of said arms having one end pivotally secured in said door frame and the other end pivotally secured to said door leaf, a centrally disposed vertical pivot axis, guide means cooperating between said door frame and said door leaf for confining the movement of the pivot axis to a combined rotational and lateral movement within the door frame during opening and closing of the door leaf, releasable stop means cooperating between the door frame and door leaf for limiting the rotation of the door leaf in one direction upon closing of the door leaf, and breakaway means for releasing the

guide means and the stop means for permitting rotation of said door leaf in the said one direction beyond the limit of the stop means whereby the door leaf may be opened in an opposite direction with respect to the normal opening direction thereof.

2. A balanced door as set forth in claim 1 wherein the stop and breakaway means includes a stationary stop member, movable shoulder means for engaging the stop member to provide said limit for rotation of the door leaf in said one direction, and yieldable means operably connected with the shoulder means and responsive to pressure of the stop means against the shoulder means for permitting movement of the shoulder means to release the engagement between the stop member and the shoulder means whereby the door leaf may be rotated in said opposite direction with respect to the normal opening direction thereof.

3. A balanced door as set forth in claim 1 wherein the breakaway means includes independent breakaway means for releasing the centrally disposed vertical pivot axis whereby the axis of rotation for the door leaf is altered to the pivotal connection between the hinge arms and door frame.

4. A balanced door as set forth in claim 3 wherein the yieldable latch means comprising a yieldable latch member being depressible upon the application of pressure against one side thereof and being constantly urged in a direction against the depression thereof whereby the latch member may be engaged with a recess provided in a hinge arm, and reset means connected with said latch member for disengaging thereof from the recess for facilitating disengagement of the connection between the hinge arm from the door leaf.

5. A balanced door as set forth in claim 1 wherein the breakaway means includes a stationary stop member, a rotatable member having a pair of converging shoulders provided on the outer periphery thereof, the first of said shoulders being engageable with the stop member in the normal position of said rotatable member for providing said limitation of rotation of said door leaf in said one direction, pressure responsive yieldable plunger means operably connected with the rotatable member for releasing the rotatable member for movement thereof to disengage the first shoulder from the stop member whereby the door leaf may be rotated for opening in an opposite direction with respect to the normal opening direction thereof, and the second shoulder provided on said rotatable member being engageable with the stop member upon closing of the door to return the rotatable member to the said normal position thereof.

6. A balanced door as set forth in claim 5 wherein the independent breakaway means includes yieldable latch means for locking the door leaf to at least one of the hinge arms for simultaneous movement therebetween, and a pivotal block member forming a complete sidewall portion for the guide means in the normal closed position thereof and engageable by the centrally disposed pivot axis for movement to an open position to provide an open passageway for releasing the centrally disposed axis from operability whereby the door leaf may be moved about the said pivotal connection between the hinge arms and door frame.

7. A balanced door as set forth in claim 6 wherein the latching means includes a complementary yieldable latch member and recess cooperating between one hinge arm and the door leaf, said latch member and recess being in a normally disengaged position whereby the door leaf may rotate about normal axis of rotation therefor, and said latch member being engaged in said recess in one relative position between the hinge arm and door leaf for locking the hinge arm and door leaf together for simultaneous movement therebetween, said locked hinge arm and door leaf rotating simultaneously about the axis of rotation of the hinge arms.

8. A balanced door as set forth in claim 6 wherein the second breakaway means includes a pivotal block mem-

ber having a normal closed position forming a complete sidewall structure for the guide means and an open position forming a completely open passageway for the release of the pivot member, yieldable plunger means cooperating with the block member for maintaining the block in said normal closed position for engagement by the pivot member, said yieldable plunger responsive to pressure on the pivot member against the block member for releasing the block member for pivotal movement to said open position whereby the pivot member is released from the normal operable position thereof.

9. A balanced door comprising a door frame, a door leaf mounted in the door frame, said door leaf being provided with an upper off-set hinge arm and a lower off-set hinge arm, each of said arms having one end pivotally secured to said door frame and the other end pivotally secured to said door leaf, a centrally disposed pivot member providing a normal axis of rotation for the door leaf, guide means cooperating with the pivot member for confining the movement of the pivot member to a combined rotational and lateral movement within the door frame, stop means cooperating between the door frame and door leaf for limiting the rotation of the door leaf in one direction upon normal closing of the door leaf, first breakaway means cooperating with the stop means whereby the door leaf may be rotated for opening in an opposite direction with respect to the normal opening direction therefor, latching means cooperating between the door leaf and at least one hinge arm for locking the door leaf to said arm in one relative position therebetween, and second breakaway means for releasing the pivot member from the guide means whereby the normal axis of rotation for the door is temporarily released and the pivot connection of the hinge arms with the door frame becomes the axis of rotation for the door leaf.

10. A balanced door comprising a door frame, a door leaf mounted in the door frame, said door leaf being provided with an upper off-set hinge arm and a lower off-set hinge arm, each of said arms having one end pivotally secured to said door frame and the other end pivotally secured to said door leaf, a centrally disposed pivot member providing a normal axis of rotation for the door leaf, guide means cooperating with the pivot member for confining the movement of the pivot member to a combined rotational and lateral movement within the door frame, stop means cooperating between the door frame and the door leaf for limiting the rotation of the door leaf in one direction, first breakaway means cooperating with the stop means for releasing the stop means whereby the door leaf may be rotated in an opposite direction, latching means cooperating between the door leaf and at least one hinge arm for locking the door leaf to said arm in one relative position therebetween and second breakaway means for releasing the pivot member from the guide means whereby the normal axis of rotation for the door is temporarily released and the pivot connection of the hinge arms with the door frame becomes the axis of rotation for the door leaf, said stop means and first breakaway means including a stationary stop member, a rotatable cam member having a pair of converging shoulders provided on the outer periphery thereof for alternate engagement with the stop member, pressure responsive releasable latch means engageable with the cam member for retaining the cam member in a normal operating position whereby one of said shoulders engages the stop member in the normal closed position of the door leaf to provide said limitation of rotation of said door leaf in the normal closing direction thereof, said releasable latch means operable for releasing the cam member for rotation upon the application of pressure against the door leaf in a direction opposite to the normal opening rotational direction of the door leaf whereby the stop member is disengaged from the said one shoulder and the door leaf may be rotated in said opposite direction.

11

11. A balanced door as set forth in claim 10 wherein the reset means is provided for the yieldable latch member for releasing the engagement between the latch member and recess for restoring the normal disengaged position therebetween.

5

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