

July 19, 1966

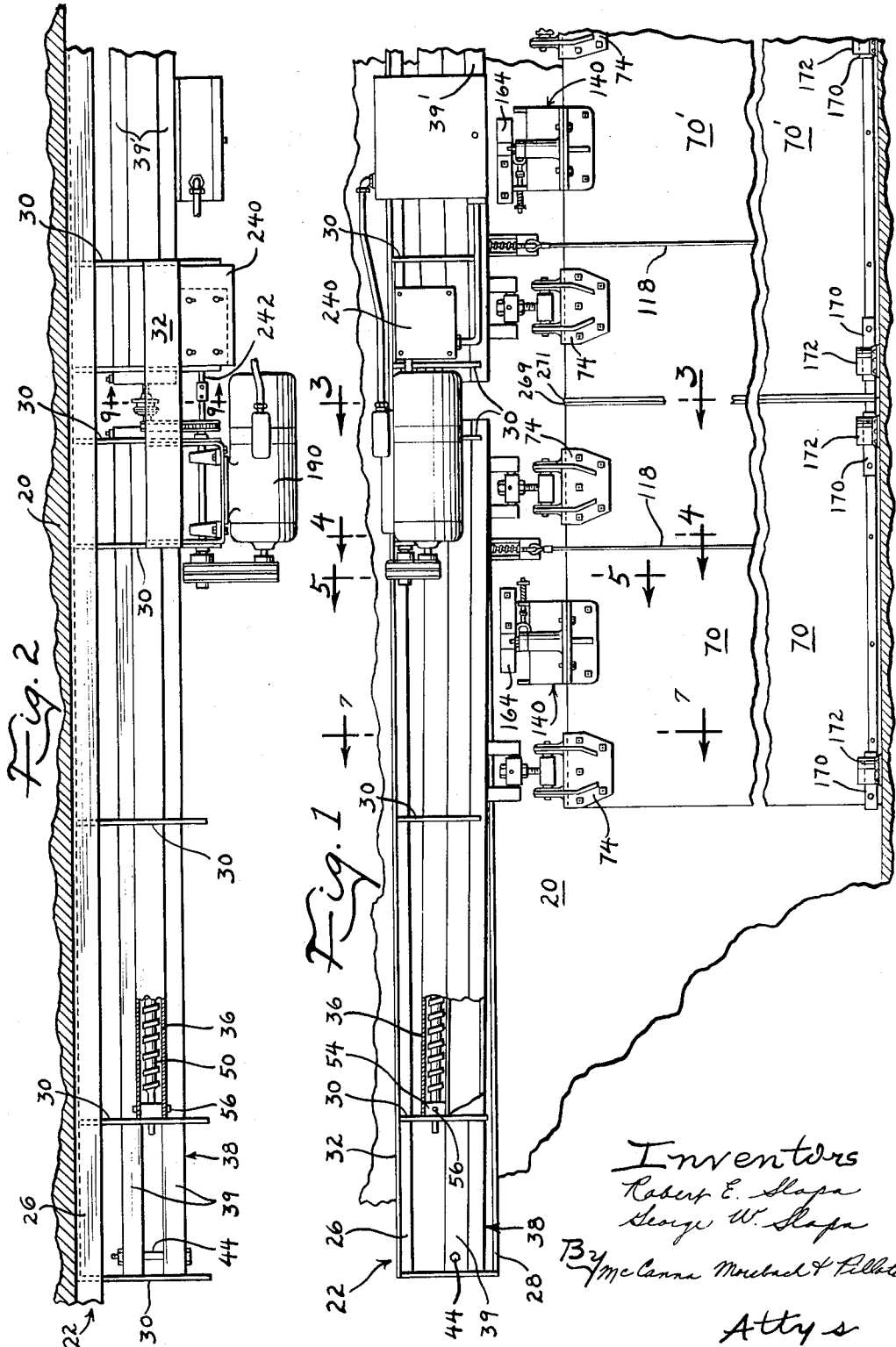
R. E. SLOPA ETAL

3,261,128

POWER OPERATED DOOR

Filed March 31, 1964

5 Sheets-Sheet 1



**July 19, 1966**

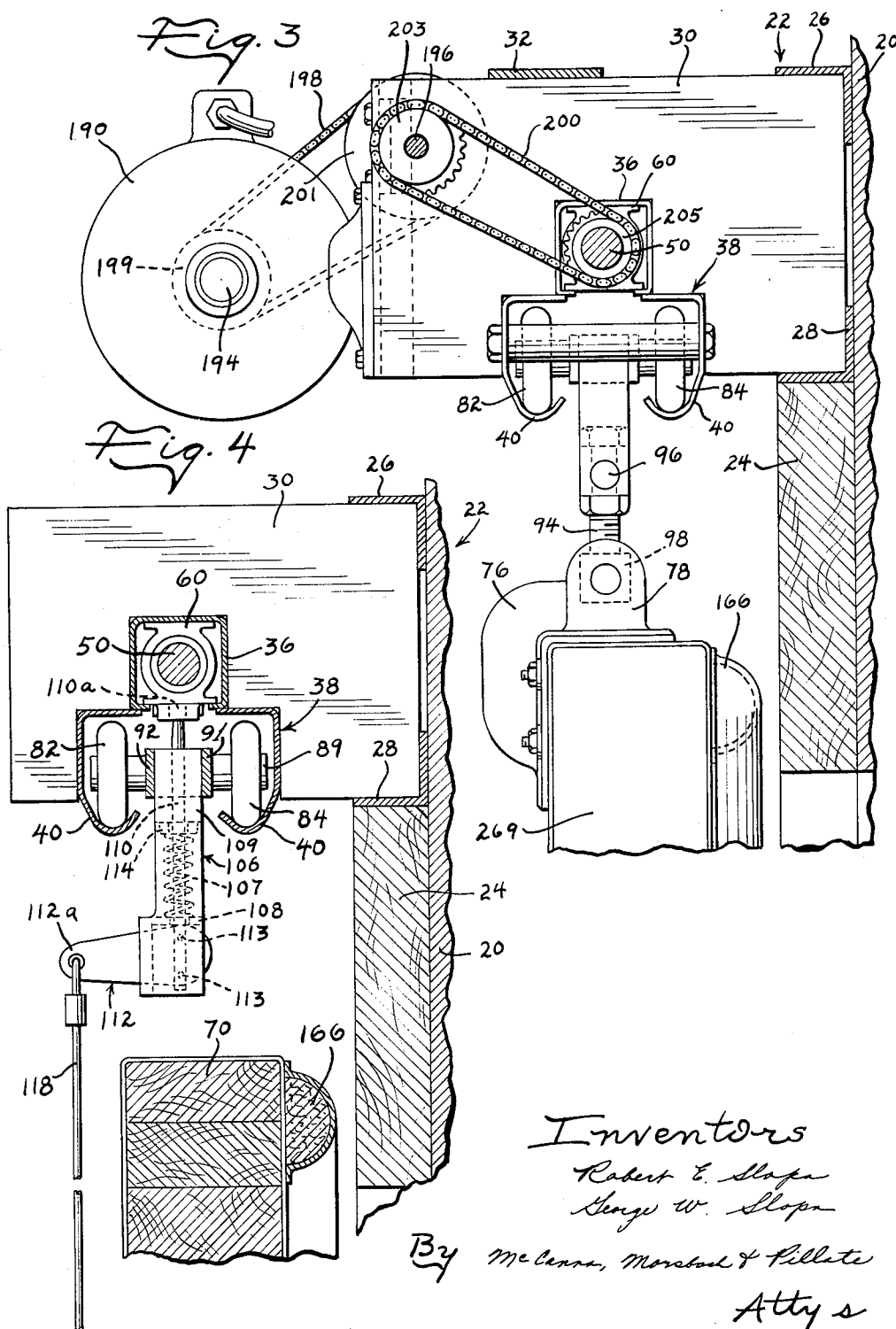
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**3,261,128**

POWER OPERATED DOOR

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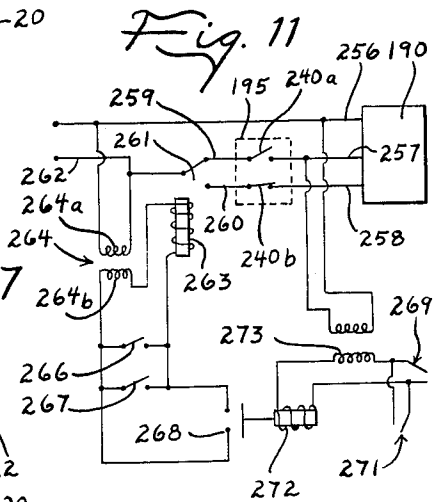
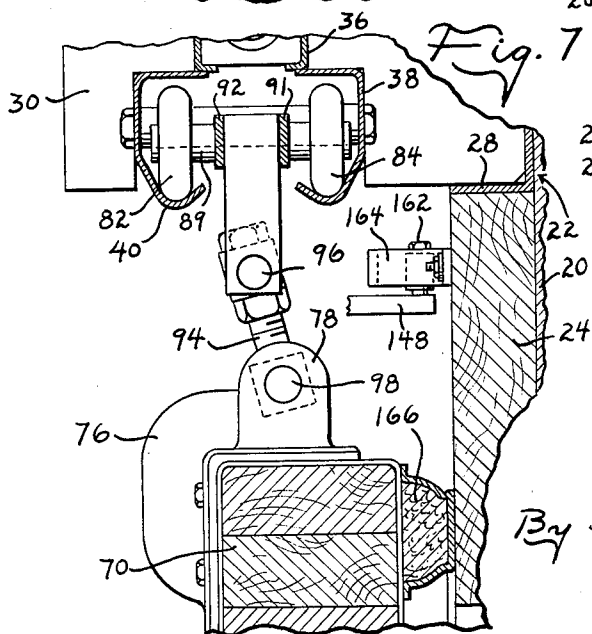
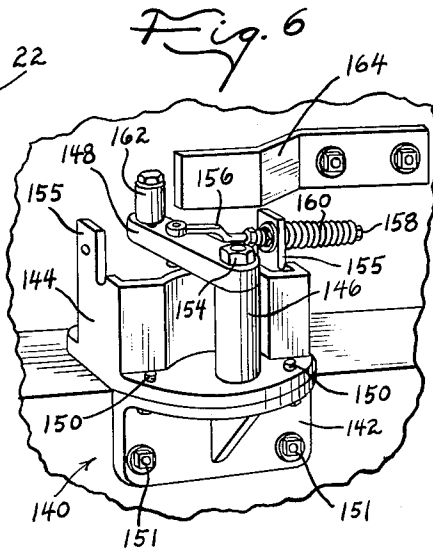
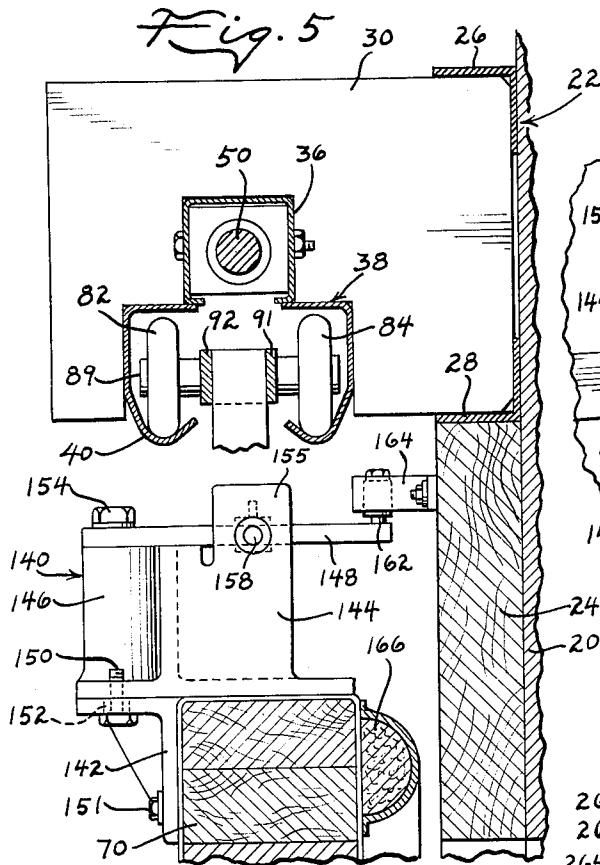
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POWER OPERATED DOOR

Filed March 31, 1964

5 Sheets-Sheet 3



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July 19, 1966

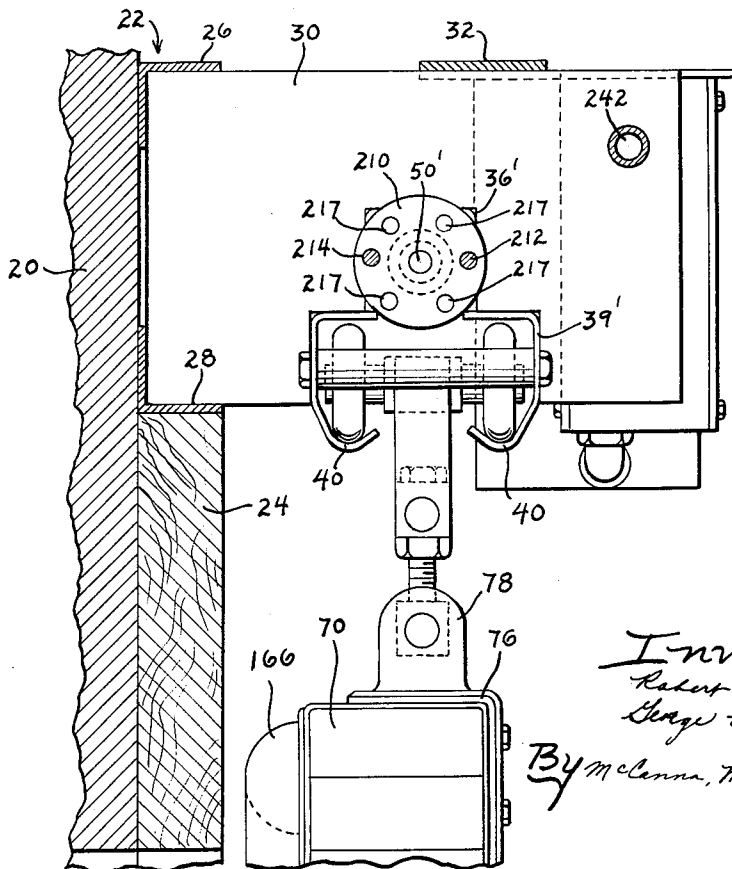
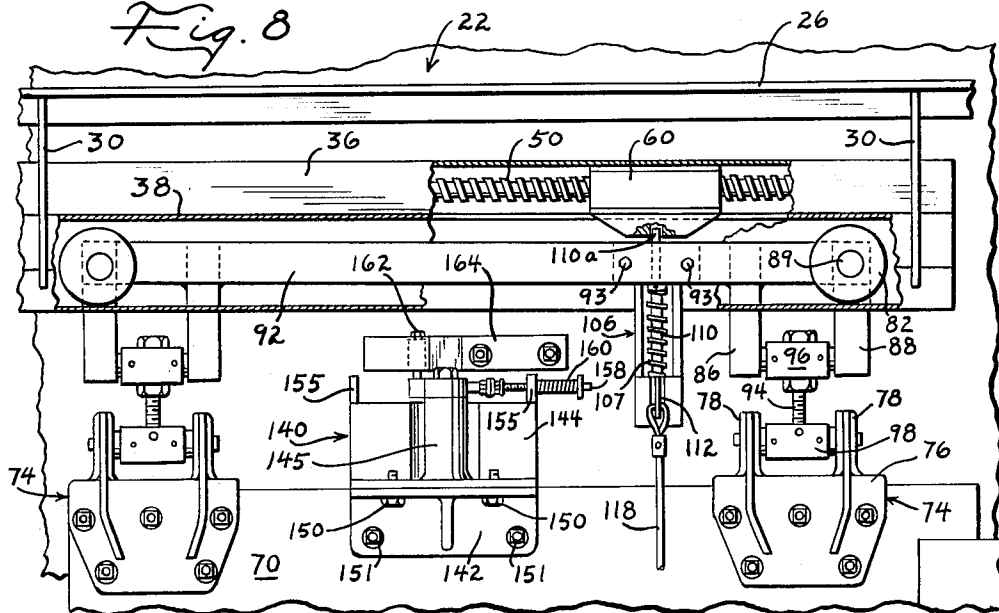
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POWER OPERATED DOOR

Filed March 31, 1964

5 Sheets-Sheet 4



*Fig. 9*

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3,261,128

## POWER OPERATED DOOR

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16 Claims. (Cl. 49-98)

This invention relates to a door operating apparatus and particularly to an apparatus for operating horizontally sliding doors. The apparatus according to the embodiment disclosed herein includes a frame, an overhead trackway, door supporting carriages, elongated screws for moving the door supporting carriages, and means to operably connect the screws to the carriages. Provision is made to shift the doors laterally of the trackway.

It is an object of the invention to provide an improved apparatus of the type described.

It is an object of this invention to provide an apparatus of the type described having safety release means mounted independently of a door, the means operatively connecting drive components to the door supporting carriages, said means being readily engageable with the drive components without cumbersome realignment of the door with the drive components.

A further object of this invention is to provide an overhead trackway inclined downwardly from its ends with elongated power operated screws paralleling the inclined portions of the trackway, such screws having adjacent ends flexibly connected to allow turning about their axes, the screws supplying power to door supporting carriages positioned at both sides of doors whereby the doors are moved smoothly without tilting.

A further object of this invention is to provide an apparatus of the type described having door supporting carriages mounted on an overhead trackway for movement thereon, said carriages being provided with means to inhibit their independent movements on the trackway with respect to each other, whereby excessive rattling or sinuous motions are not imparted to the doors.

It is yet a further object of this invention to provide an apparatus of the type described with improved means to laterally shift doors on carriages with respect to the trackway to effect a sealing engagement of the doors over an opening and limit their parallel movement on the trackway in closing.

These, together with various ancillary objects and advantages of this invention will be more readily appreciated as the same becomes better understood by reference to the following detail description when taken in connection with the accompanying drawings wherein:

FIG. 1 is a fragmentary elevation view showing a pair of doors in closed or sealed position and a door operating apparatus for separating and closing the doors and with parts cut away to better illustrate the apparatus;

FIG. 2 is a fragmentary top view with parts cut away of the apparatus in FIG. 1;

FIG. 3 is a partial cross sectional view along lines 3-3 in FIG. 1 showing power supply components and a pendant door but with the door in an open position spaced from the door frame;

FIG. 4 is a partial cross sectional view along lines 4-4 in FIG. 1 showing manually operable escape components and illustrating the door in an open position;

FIG. 5 is a partial cross sectional view along lines 5-5 in FIG. 1 showing components to laterally shift the door with respect to the trackway and into sealed position;

FIG. 6 is a perspective view of the components to laterally shift the doors;

FIG. 7 is a sectional view taken generally along line 7-7 of FIG. 1 and illustrates a door in sealing engagement with the door frame;

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FIG. 8 is an enlarged view of portions in FIG. 1 with parts cut away illustrating components for operatively connecting a door to drive elements including means to fixedly connect the carriages;

FIG. 9 is a partial cross sectional view along lines 9-9 in FIG. 2;

FIG. 10 is an enlarged bottom view of portions in FIG. 2 illustrating motor, screw, and limit switch assemblies; and

FIG. 11 is a schematic diagram of an electrical circuit for controlling the apparatus.

The embodiment shown in the accompanying drawings illustrates a pair of doors with a door operating apparatus having similar components for each door. Hereinafter, the components will be described, in some instances, for opening one of the doors, and therefore like components in some instances will have like numerical designations.

Reference is now made more specifically to the accompanying drawings, particularly to FIGS. 1, 2, and 3, wherein there is illustrated a wall 20, said wall having a wall opening therein. An overhead frame 22 is suitably affixed over the opening to the wall and may conveniently overlie the door frame 24. Frame 22 comprises a pair of elongated angles 26 and 28, with a series of upright portions 30 transversely affixed thereto. A stiffening plate 32 may be employed to tie intermediate upright portions together and add rigidity to frame 22. Upright portions 30 have suitable cutouts therein to accommodate screw housing 36 and trackway 38, the housing, trackway, and upright portions being affixed together as by welding or the like.

Trackway 38 is configured to accommodate door supporting carriages and has spaced rails or channel portions 40 for movement of carriage wheels thereon. Bolt assembly 44 (FIG. 2) and bolt assembly 45 (see FIG. 10) aid in maintaining the channel portions in their relative positions and provide stop means for the carriages on the trackway.

It is to be understood that components of the apparatus including the trackway and screw housing may be conveniently made in two portions as illustrated in the drawings.

Referring to FIGS. 1, 2, 3 and 10, a pair of elongated screws 50 and 50' (see FIG. 10) are supported on the frame. More particularly, screw 50 is positioned in screw housing portion 36 and has one end journaled into bearing portion 54, said bearing portion being affixed to one end of the screw housing 36 by bolt assembly 56. The other end of screw 50 is journaled into bearing portion 58 (see FIG. 10) affixed to the other end of the screw housing 36. Follower 60 is threadably engaged to screw 50 and is slidably mounted in housing portion 36. Similarly, screw 50' is positioned in screw housing portion 36' and has an outer end journaled into a bearing portion (not illustrated) and the other end journaled into bearing portion 58'. Follower 60' is threadably engaged to screw 50' and mounted in housing portion 36'.

Doors 70 and 70' are mounted on a plurality of door supporting carriages 74 as best seen in FIGS. 1 and 8. By reference to FIGS. 7 and 8, it will be seen that the carriages individually comprise a generally L-shaped portion 76 having a pair of spaced ears 78. A pair of upright bars 86 and 88 have a pivot assembly 96 mounted on their lower ends for pivotal movement about a horizontal axis paralleling the track, and wheels 82 and 84 are mounted on the upper end of upright bar 88 by means of axle 89. Link 94 is threadably engaged at one end to pivot assembly 96 and is threadably engaged at its other end to a pivot assembly 98, pivot assembly 98 being supported between ears 78 for movement about an axis paralleling the door. By such threaded engagement, the door

may be adjusted vertically over the frame by adjusting the length of link 94, and, it will be thus apparent that L-shaped portion 76 affixed to the door may be shifted laterally relative to the upright bars 86 and 88 as well as the overhead trackway. This lateral shifting feature will be more fully appreciated from the description herein-after.

In opening and closing doors by conventional apparatus similar to the type herein described, it has been found that door supporting carriages tend to wobble or otherwise have independent movement with respect to each other when travelling on a trackway. Such independent movement tends to evidence itself by an excessive rattling or sinuous motion of a door in movement on the trackway. By referring to FIG. 1, it will be seen that a pair of carriages are mounted on the upper ends and edges of each door, one towards each side. Rigid plates 91 and 92 (FIGS. 5, 7, and 8), affixed one on each side of a pair of carriages as by welding, fixedly connect one carriage to another. Plates 91 and 92 inhibit the independent motion of one carriage with respect to the other on the trackway and generally force the carriages to act in unison thereby inhibiting rattling or sinuous motion of doors supported on such carriages. Conveniently, axle 89 projects through the ends of plates 91 and 92 affording a firm carriage to carriage structure.

The apparatus herein described and illustrated is especially adaptable for use with enclosures such as coolers and freezers. It can be appreciated that manual means must be provided to operate the doors inside such enclosures for escape purposes should power fail or for other purposes requiring manual escape. FIGS. 4 and 8 illustrate a particularly advantageous escape mechanism. Pin housing 106 is suitably affixed between plates 91 and 92 as by fasteners 93 or the like. Housing 106 has a chamber therein for accommodation of pin 110 and helical spring 107. The chamber in the pin housing is restricted by lower and upper neck portions 108 and 109 respectively, the portions conveniently being integral with housing 106. Pin 110 is slidable in the upper and lower neck portions and is normally biased upwardly by spring 107 pressing against the lower neck portion, and, by pressing against collar 114, collar 114 being affixed to pin 110 and the pin being urged against the upper neck portion. The normal bias of pin 110 brings its tip portion 110a into engagement with follower 60 whereby power supplied in turning screw 50 moves follower 60 which moves housing 106. Housing 106, affixed to plates 91 and 92, in turn transmits the power directly to the carriages for door movement. Thus, it can be seen that the escape mechanism is also the motion transmitting means from the follower 60 to the door.

In further considering the escape mechanism, offset member 112 is fixedly connected to the lower end of pin 110 by fasteners 113 and extends perpendicularly thereto and has an end 112a spaced outwardly from the upper door end. A chain, cord, or other flexible means 118 is connected to end 112a and is led down the outside face of the door and through the door into the enclosure. It can be readily understood that by pulling cord 118 either from the inside or outside of the enclosure, pin 110 is pulled downward and tip portion 110a disengages from its associative follower 60. The door is thereby rendered manually operable on the trackway since the carriages may move on the trackway independently of the power components. Re-engagement of tip portion 110a in its associative follower is rendered simple by such an escape mechanism. In conventional apparatuses, the escape mechanism is often mounted upon the door and directly connected to power driven chains. Such power driven chains are subject to slack and tension in different sections thereof caused by the chain holding the door in a closed position. When the escape mechanism is released from engaging means on the chain, the tension in the chain pulls the engaging means out of

alignment with the escape mechanism to such an extent that laborious alignment of the chain, requiring manual alignment if power has failed, is necessary. The escape mechanism of the instant invention overcomes such disadvantage since no slack or tension is occasioned in the follower and the screw associated with tip 110a when door 70 is held in a closed position. The follower therefore will always be in a correct position for re-engagement by tip 110a thereby positioning the door in relation to the operating apparatus. Re-engagement may be accomplished by moving the follower by power to tip 110a, or, if power has failed, by moving the door to position tip 110a in alignment with the follower.

Another advantage of the apparatus so far described and illustrated is that power is transmitted directly to both edges of a door through carriages mounted thereat whereby the door is closed evenly and smoothly in opening and closing. A tilting motion is often encountered with apparatuses transmitting power to open and close a door at a midpoint rather than at both lateral edges of a door. The instant invention transmits power from the follower to rigid plates 91 and 92, then to the carriages, and finally to the edges of the door. Such an arrangement results in a balanced pulling characteristic whereby door tilting is minimized.

The aforescribed apparatus effects movement of doors parallel to the wall between an open and closed position over an opening, and, may also effect movement of the doors in a direction laterally of the trackway into engagement with the door frame. The lower edges of the doors are urged laterally against the frame just prior to closing by means of wedges 170 which are attached to the doors adjacent the lower edges thereof and which engage resiliently supported wedge blocks 172 mounted on the floor adjacent the door opening and suitably positioned for the doors as they reach their closed position (FIG. 1). A seal is effected between the bottom of the doors and the floor by inclining the trackway slightly, as hereinafter more particularly described, so that the doors move downwardly as they approach their closed position to effect a seal between gaskets on the lower edge of the doors and the floor.

Trackway 38 is attached to the frame 22 in such a manner that it is inclined downwardly to an intermediate point. Said trackway may conveniently be made in two portions 39 and 39' (FIGS. 1 and 2) which portions are inclined downwardly toward each other and are separated for accommodation of other assemblies of the instant apparatus. The associative screw housings and elongated screws are disposed substantially parallel to the inclined portions 39 and 39'. Thusly, the inclined trackway portions cause the doors to move downwardly as they approach their closed position to effect a seal between the gaskets on the lower edge of the doors and the floor with the aid of wedges 170 and blocks 172.

Many enclosures such as refrigerators and cooler enclosures require a tight seal between the door frame and the doors. For this purpose, a lateral shifting mechanism is provided, as best illustrated in FIGS. 5, 6 and 8, and which cooperates with the aforescribed wedges 170 to effectuate the tight seal. Lateral shifting member 140 comprises L-shaped angle 142 affixed to the upper edge of the door by fasteners 151. Cam base 144 is mounted on the upper end of the angle 142 and fastened thereto by fasteners 150. The cam base is preferably mounted for limited adjustment relative to the angle 142 in a direction crosswise of the door and, as shown in FIG. 5, the fasteners 150 extend through elongated openings 152 in the angle 142. Post 146 extends vertically upwardly from cam base 144 and pivotally supports cam lever 148 by means of bolt assembly 154. Ears 155 on the cam base are spaced from opposite sides of the cam lever. Rod 158 extends through one ear and is connected to clevis 156 which in turn is connected to the cam lever. Spring 160, mounted on rod 158, maintains the cam lever

in a normal position extending generally transverse to the wall. Cam engaging device or hook 164 is mounted on the door frame and defines a throat therewith for engagement with the lateral shifting member 140 when the door approaches its closed position. More particularly, roller 162 is mounted on the other end of cam lever 148 and is brought into hooking engagement with hook 164 in the throat defined by the hook and enclosure as the door approaches a closed position. As roller 162 engages hook 164, cam lever 148 turns about post 146 in a counter-clockwise direction (looking downwardly on member 140 for a door opening to the left). As roller 162 engages hook 164, the door is moved laterally with respect to the trackway whereby gasket 166 is brought into a sealing engagement with the door frame. This may be illustrated by reference to FIGS. 3 and 7. FIG. 3 shows a door in its normal pendant position, while FIG. 7 shows a door shifted laterally on pivot assemblies 96 and 98 by means of cam lever 148 having turned in response to roller 162 having engaged hook 164. Thus, lateral shifting member 140 in conjunction with hook 164 limits the parallel movement of the door with respect to the wall in assuming its closed position while at the same time laterally shifting the door with respect to the trackway to effect the sealing engagement.

Reference may now be had to FIGS. 3 and 10 wherein motor 190 is attached to the frame by means of mount 192 secured to a pair of the upright portions 30. Motor shaft 194 is connected to drive shaft 196 by means of belt 198, and pulleys 199, 201 mounted on ends of the shafts. Shaft 196 is operably connected to screw 50 through chain 200 and sprockets 203, 205, said sprockets being mounted on ends of shaft 196 and screw 50. Screws 50 and 50' are disposed parallel to trackway portions 39 and 39', respectively, and said screws are connected together by means of universal joint 202. Universal joint 202 (FIG. 10) comprises circular flange 210 affixed to the end of screw member 50' and a flange 211 affixed to the end of screw 50. A universal joint spider is provided between the flanges 210 and 211. As shown, the spider includes bearing housing portions 204 and 206 which are fastened by means of fasteners 208, said portions being connected to flanges 210 and 211 by means of drive pins 212, 214, 216 and 218. It will be readily understood that drive pins 212 and 214 are swivelly connected to the bearing housing at points 180° offset from each other while drive pins 216 and 218 are swivelly connected to the bearing housing at points 90° offset from the pins 212 and 214. The relatively inclined screws 50 and 50' are thus connectedly turnable about their axes when supplied by a rotating motion from motor 190. In order to enable adjustment of the center position of the doors to assure that the bi-parting doors meet properly at the center of the door opening when in their closed position, one of the flanges such as 210 is provided with a plurality of pairs of circumferentially spaced openings 217 for receiving the drive pins 212 and 214. Thus, the drive pins can be disconnected from the flange 211 and the shaft then turned one way or the other relative to the other shaft until the doors are symmetrical with respect to the door opening.

Referring particularly to FIGS. 2 and 10, a rotary limit switch 240 is attached to two upright portions 30 adjacent to an end of screw 50'. Switch 240 is operatively connected to shaft 196 by means of flexible drive shaft 242. The rotary limit switch will be operated in accordance with the position of the doors and is electrically connected to the motor operating circuit in the conventional manner to de-energize the motor when the door reaches its open or closed position. The motor is arranged for reversible operation and as diagrammatically shown in FIG. 11, one of the motor conductors 256 is connected directly to the source of power. The other motor conductors 257 and 258 are connected to limit switches 240a and 240b and conductors 259

and 260 to a three-way reversing switch 261, which reversing switch is connected through conductor 262 to the source of power. The reversing switch is operated between one position establishing a circuit to one of the conductors 259, and a second position establishing a circuit to the other of said conductors 260, each time the solenoid 263 is energized. The solenoid 263 is conveniently energized from a low voltage power circuit which is supplied from a transformer 264 having its primary 264a connected to conductors 256 and 262. The secondary 264b is connected to the solenoid 263 and a plurality of normally-open parallel-connected switches 266, 267, and 268 are provided for controlling energization of the solenoid. Switches 266 and 267 are located at relatively opposite sides of a door to enable actuation of the door operated from either side or outside the cooler or freezer enclosure, and may be operated manually or by a photo-electric cell or similar device. The switch 268 is arranged to be operated by the safety edges 269, 271 on the leading edges of the doors. For this purpose, the switch 268 is operated by solenoid 272 which is energized from the secondary of the transformer 273 under the control of the normally open circuit breakers in the safety edges. The primary of transformer 273 is connected to conductors 256 and 257. When the reversing switch 261 and the limit switches 240a and 240b are in the position shown in FIG. 11, the doors are in their closed position. When one of the switches 266, 267 is closed, the reversing switch 261 is moved to establish a circuit to the other conductor 260 and energizes the motor 190 in a reverse direction through limit switch 240b until the doors reach their open position at which time switch 240b opens and stops the doors. As the doors move away from their closed position, limit switch 240a closes. When one of the switches 266, 267 is again operated, the reversing switch moves back to its first-mentioned position and establishes a circuit to the motor through the limit switch 240a and energizes the same in the forward direction to close the doors. When the doors reach their closed position, limit switch 240a opens and stops the motor. However, as one of the safety edges 269, 271, which are connected in parallel, engages an obstacle, the switch 268 will be closed thereby operating the reversing switch 261 and effecting reversal of the direction of the movement of the door.

While an embodiment of this invention has been described and illustrated, it is understood, of course, that the invention is not so limited, since modifications may be made. It is contemplated, therefore, by the appended claims, that any such modifications as fall within the true spirit of the scope of this invention are therefore covered.

We claim:

1. An apparatus for separating and closing a pair of doors over a door opening comprising, a frame, an overhead trackway inclined downwardly from its ends to an intermediate point and secured to the frame, door supporting carriages mounted on the trackway for supporting the doors on the trackway for movement thereon, a pair of elongated screw members mounted on the frame and operatively connected to the carriages, one such screw member disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, connecting means for flexibly connecting adjacent ends of said screw members whereby the screw members are connectedly turnable about their axes, said connecting means having means disconnectable for selectively turning said screw members about their axes and moving said carriages along the trackway thereby by adjusting the relative positions of the doors, and means for turning the screw members about their axes.

2. An apparatus for separating and closing a pair of doors over a door opening comprising, a frame, an overhead trackway inclined downwardly from its ends to an



intermediate point and secured to the frame, door supporting carriages mounted on the trackway for supporting the doors on the trackway for movement thereon, and a pair of elongated screw members mounted on the frame and operatively connected to the carriages, one such screw member disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, a universal joint connecting opposing ends of the screw members whereby they are connectably turnable about their axes, means for rotating the screw members about their axes, said universal joint including first and second members each operatively connected to a respective screw member for rotation therewith, means for interconnecting said first and second members, and one of said first and second members having a plurality of spaced openings for selectively receiving said last-mentioned means thereby allowing the screw members to be selectively positioned relative to each other.

3. An apparatus for separating and closing a pair of doors over a door opening comprising, a frame, an overhead trackway inclined downwardly from its ends to an intermediate point and secured to the frame, first and second pairs of door supporting carriages mounted on the trackway, the first pair being spaced for supporting one door on the trackway for movement thereon and the second pair being spaced for supporting the other door on the trackway for movement thereon, means for laterally shifting each door on its carriages with respect to the trackway to effect a sealing engagement of the doors over the opening, a pair of elongated screw members mounted on the frame, one screw member disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, said screw members having ends flexibly connected whereby the screw members are connectably turnable about their axes, means for operatively connecting the screw members to the carriages including a first rigid member fixedly connecting the first pair of carriages and a second rigid member fixedly connecting the second pair of carriages whereby the carriages are inhibited from a sinuous motion, in movement on the trackway, and means to turn the screw members about their axes.

4. An apparatus for separating and closing a pair of doors over a door opening comprising, a frame, an overhead trackway inclined downwardly from its ends to an intermediate point and secured to the frame, door supporting carriages mounted on the trackway for supporting the doors on the trackway for movement thereon, a pair of elongated screw members mounted on the frame, one screw member disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, said screw members having ends flexibly connected whereby the screw members are connectably turnable about their elongated axes, means mounted independently of the doors operatively connecting the screw members to the carriages including first and second followers and engaging means, the first follower threadably engaged on one screw member and the second follower threadably engaged on the other screw member, each engaging means connecting the associated follower to the respective carriage, at least one of said engaging means being manually disconnectible from its associated follower to allow manual movement of an associative door on the trackway independently of the screw members, and means for turning the screw members about their axes.

5. An apparatus for separating and closing a pair of doors over a door opening comprising, a frame, an overhead trackway inclined downwardly from its ends to an intermediate point and secured to the frame, first and

second pairs of door supporting carriages mounted on the trackway, the first pair being spaced for supporting one door on the trackway for movement thereon and the second pair being spaced for supporting the other door on the trackway for movement thereon, means to laterally shift the doors on the carriages with respect to the trackway to effect a sealing engagement of the doors over the opening, a pair of elongate screw members, one screw disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, a universal joint connecting opposing ends of the screw members whereby they are connectably turnable about their axes, means operatively connecting the screw members to the carriages including a first rigid member fixedly connecting the first pair of carriages and a second rigid member fixedly connecting the second pair of carriages whereby the carriages are inhibited from a sinuous motion in movement on the trackway, and means to turn the screw members about their axes.

6. An apparatus for opening and closing a door over a door opening comprising, a frame, an overhead trackway secured to the frame, a pair of spaced door supporting carriages moveably mounted on the trackway adjacent opposite sides of the door, means to laterally shift the door on the carriages with respect to the trackway to effect a sealing engagement of the door over the opening, an elongated screw member mounted on the frame, a rigid member fixedly connecting one carriage to the other whereby the carriages are inhibited from a sinuous motion in movement on the trackway, a follower threadably engaged on the screw member, engaging means connecting the follower to the rigid member, means for manually disconnecting said engaging means from the follower to allow manual movement of the door on the trackway independently of the screw member, and means for turning the screw member about its axis.

7. An apparatus for separating and closing a pair of doors over a door opening comprising, a frame, an overhead trackway inclined downwardly from its ends to an intermediate point and secured to the frame, first and second pairs of door supporting carriages mounted on the trackway, the first pair being spaced for supporting one door on the trackway for movement thereon and the second pair being spaced for supporting the other door on the trackway for movement thereon, means to laterally shift the doors on the carriages with respect to the trackway to effect a sealing engagement of the doors over the opening, a pair of elongated screw members mounted on the frame, one screw member disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, said screw members having ends flexibly connected whereby the screw members are connectably turnable about their axes, first and second rigid members, the first rigid member fixedly connecting the first pair of carriages and the second rigid member fixedly connecting the second pair of carriages whereby the carriages are inhibited from sinuous motions in movement on the trackway, first and second followers threadably engaged on the screw members, one follower on each screw member, engaging means connecting one of the followers to one of the rigid members and connecting the other follower to the other rigid member, said engaging means being manually disconnectible with respect to at least one follower to allow manual movement of at least one door on the trackway independent of the screw members, and means to turn the screw members about their axes.

8. An apparatus for separating and closing a pair of doors over a door opening comprising, a frame, an overhead trackway inclined downwardly from its ends to an intermediate point and secured to the frame, first and second pairs of door supporting carriages mounted on the

trackway, the first pair being spaced for supporting one door on the trackway for movement thereon and the second pair being spaced for supporting the other door on the trackway for movement thereon, means to laterally shift the doors on the carriages with respect to the trackway to effect a sealing engagement of the doors over the opening, a pair of elongated screw members mounted on the frame, one screw member disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, a universal joint connecting opposing ends of the screw members whereby they are connectedly turnable about their elongate axes, first and second rigid members, the first rigid member fixedly connecting the first pair of carriages and the second rigid member fixedly connecting the second pair of carriages whereby the carriages are inhibited from sinuous motions in movement on the trackway, first and second followers threadedly engaged on the screw members, one follower on each screw member, engaging means connecting one of the followers to one of said rigid members and connecting the other follower to the other rigid member, said engaging means being manually disconnectable with respect to at least one follower to allow manual movement of at least one door on the trackway independently of the screw members, and means to turn the screw members about their axes.

9. In an apparatus for covering an opening in an enclosure comprising, a frame for mounting overhead the opening, an overhead trackway secured to the frame, a pair of door supporting carriages mounted on the trackway for supporting the door on the trackway for movement thereon, said carriages including pivot means to allow lower portions of the carriages to shift laterally of the trackway, a door supported on said lower portions, lateral shifting means mounted on the upper end of the door including a cam member pivotally mounted on said upper end about a vertical axis and an upright element mounted on an end of the cam member parallel to said axis, said cam member normally disposed to extend the upright element toward the enclosure, a hook member mounted on the enclosure for engaging and retaining the upright element as the door approaches its closed position whereby the door is shifted laterally on the pivot means to effect a sealing engagement over the opening, a rigid member fixedly connecting one carriage to the other whereby the carriages are inhibited from a sinuous motion in movement on the trackway, an elongated screw member mounted on the frame, a follower threadedly engaged on the screw member, engaging means connecting the follower to the rigid member, said engaging means being manually disconnectable from the follower to allow manual movement of the door on the trackway independently of the screw member, and means to turn the screw member about its axis.

10. In an apparatus for covering an opening in an enclosure comprising, a frame for mounting overhead the opening, an overhead trackway inclined downwardly from its ends to an intermediate point and secured to the frame, first and second pairs of door supporting carriages mounted on the trackway, the first pair being spaced for supporting one door on the trackway for movement thereon and the second pair being spaced for supporting the other door on the trackway for movement thereon, the carriages including pivot means to allow lower portions of the carriages to shift laterally of the trackway, a pair of doors supported on said lower portions, lateral shifting means mounted on the upper end of each door including for each door a cam member pivotally mounted on said upper end about a vertical axis and an upright element mounted on an end of the cam member parallel to said axis, said cam member normally disposed to extend the upright element toward the enclosure, a pair of hook members mounted on the enclosure for engaging and retaining the upright elements as the doors approach their

closed position whereby the doors are shifted laterally to effect a sealing engagement over the opening, first and second rigid members, the first rigid member fixedly connecting the first pair of carriages and the second rigid member fixedly connecting the second pair of carriages whereby the carriages are inhibited from sinuous motions in movement on the trackway, a pair of elongated screw members mounted on the frame, one screw member disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, said screw member having ends flexibly connected whereby the screw members are connectedly turnable about their axes, first and second followers threadedly engaged on the screw members, one follower on each screw member, engaging means connecting one of the followers to one of the rigid members and connecting the other follower to the other rigid member, said engaging means being manually disconnectable with respect to at least one follower to allow manual movement of at least one door on the trackway independently of the screw members, and means to turn the screw members about their axes.

11. An apparatus for separating and closing a pair of doors over a door opening comprising, a frame, an overhead trackway inclined downwardly from its ends to an intermediate point and secured to the frame, door supporting carriages mounted on the trackway for supporting the doors on the trackway for movement thereon, a pair of elongated screw members mounted on the frame, one such screw member disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, connecting means for flexibly connecting adjacent ends of said screw members whereby the screw members are connectedly turnable about their elongated axes, said connecting means having means disconnectable for selectively turning said screw members about their axes and moving said carriages along the trackway thereby adjusting the relative positions of the doors, means for turning the screw members about their axes, first and second means each for operatively connecting one of said screw members to the respective carriage and each including a follower threadedly engaged on the screw member and engaging means mounted on the carriage for engaging the follower to operatively connect the follower to the carriage, and means for manually disconnecting at least one of said engaging means from its respective follower to thereby allow manual movement of one door on the trackway independent of the screw member.

12. An apparatus for separating and closing a pair of doors over a door opening, comprising, a frame, an overhead trackway inclined downwardly from its ends to an intermediate point and secured to the frame, door supporting carriages mounted on the trackway for supporting the doors on the trackway for movement thereon, a pair of elongated screw members mounted on the frame, one screw member disposed substantially parallel to one inclined portion of the trackway and the other screw member disposed substantially parallel to the other inclined portion of the trackway, a universal joint connecting opposing ends of the screw members whereby they are connectedly turnable about their elongated axes, means for rotating the screw members about their axes, said universal joint including first and second members each operatively connected to a respective screw member for rotation therewith, means for interconnecting said first and second members, one of said first and second members having a plurality of spaced openings for selectively receiving said last-mentioned means thereby allowing the screw members to be selectively positioned relative to each other, means mounted independently of the doors for operatively connecting the screw members to the carriages and including first and second followers and engaging

means, the first follower threadedly engaged on one screw member and the second follower threadedly engaged on the other screw member, the engaging means connecting the followers to the carriages, and means for manually disconnecting at least one of said engaging means from its associative follower to allow manual movement of an associative door on the trackway independent of the screw members.

13. An apparatus for covering an opening in an enclosure comprising, a door, a frame for mounting overhead the opening, an overhead trackway secured to the frame, a pair of door supporting carriages moveably mounted on the trackway adjacent opposite ends of the door said carriages including pivot means to allow lower portions of the carriages to shift laterally of the trackway, means for supporting the door adjacent opposite ends thereof on said lower portions, a rigid member connecting the carriages for inhibiting sinuous movement of the carriages on the trackway, power operated means operatively connected to the carriages for moving the carriages in the trackway thereby moving the door, and a single lateral door shifter mounted on the upper end of the door intermediate the carriages for moving the door laterally to effect a sealing engagement over the opening and including a cam member pivotally mounted on said upper end about a vertical axis and extending laterally toward said enclosure, an engaging element mounted on the lateral end of the cam member and generally parallel to said axis, means for urging said cam member generally perpendicular of the door to extend the engaging element toward the enclosure, and a hook member mounted on the enclosure and defining a longitudinal stop for engaging and retaining the engaging element as the door approaches its closed position causing the door to shift laterally about the engaging element to a position in sealing engagement over the opening.

14. The apparatus as set forth in claim 13 wherein the power operated means comprises an elongate screw member mounted on the frame and generally parallel to the trackway, means for moving the screw member about its axis, a follower threadedly engaged on the screw member for movement therealong as the screw is rotated, engaging means for connecting the follower to said rigid member, and means for manually disconnecting the engaging means to allow manual movement of the door along the trackway independently of movement of the screw member.

15. A sliding door operating mechanism for separating and closing a door over a door opening comprising: a trackway having a pair of spaced rails extending longitudinally thereof; support means for mounting the trackway above a door frame and laterally spaced therefrom; carriage means mounted on the trackway for movement therealong and supporting the door, said carriage means including a first pair of wheels supported on the spaced rails adjacent one side of the door and a second pair of wheels supported on the spaced rails adjacent the other side of the door, a rigid member fixedly connecting the first and second pair of wheels whereby the wheels are inhibited from sinuous movement on the rails, first and second mounting plates attached to the door adjacent the sides thereof, and first and second double pivoted connectors each attached to one of the mounting plates and to the rigid member for allowing limited movement of the door laterally of the trackway; means for moving the door laterally of the trackway and into tight sealing engagement with the door frame simultaneously with movement of the door on the trackway; an elongate screw member mounted on the support means and generally parallel to the trackway; means for moving the screw member about its axis; a follower threadedly engaged on

the screw member and having a receiving means thereon; an engaging means mounted on said rigid member and having a portion resiliently urged toward the follower for engaging the receiving means whereby rotation of the screw member causes the door and carriage means to move along the trackway; and means for manually disconnecting said portion from the receiving means thereby allowing manual movement of the door on the trackway independently of the screw member.

16. An apparatus for separating and closing a pair of doors over a door opening in an enclosure comprising: a trackway having a pair of spaced rails extending longitudinally thereof; support means for supporting said trackway with its rails inclined downwardly from its ends to an intermediate point and for mounting the trackway above the door opening and laterally spaced therefrom; first and second carriage means mounted on the trackway for movement therealong, each carriage means supporting one of said doors and including first and second pairs of wheels supported on the spaced rails adjacent opposite sides of the associate door, a rigid member fixedly connecting the first and second pairs of wheels whereby the wheels are inhibited from sinuous movement on the rails, first and second double pivoted connectors attached adjacent opposite sides of the associate door at one end and to the rigid member at the other end for allowing limited movement of each door laterally of the trackway; lateral shifting means for moving each door laterally of the trackway and into tight sealing engagement with the enclosure simultaneously with movement of the door along the trackway, each said lateral shifting means including a cam member pivotally mounted on the upper end of one door and extending laterally toward the enclosure, and a hook member mounted on the enclosure for engaging and retaining the cam member as the door approaches closed position thereby providing a stop and pivot to laterally shift the door into sealing engagement over the opening; a pair of elongate screw members mounted on the support means, one screw member disposed generally parallel to one inclined portion of the trackway and the other screw member disposed generally parallel to the other inclined portion of the trackway; means for rotating said screw members about their axes; first and second members each operatively connected to a respective screw member for rotation therewith, means for interconnecting said first and second members, one of said first and second members having a plurality of spaced openings for selectively receiving said last-mentioned means thereby allowing the screw members to be selectively positioned relative to each other; means mounted independently of the doors for operatively connecting each screw member to one of said carriage means; and means for manually disconnecting at least one of the carriage means from its associate screw member to allow movement of the door along the trackway independently of the screw member.

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