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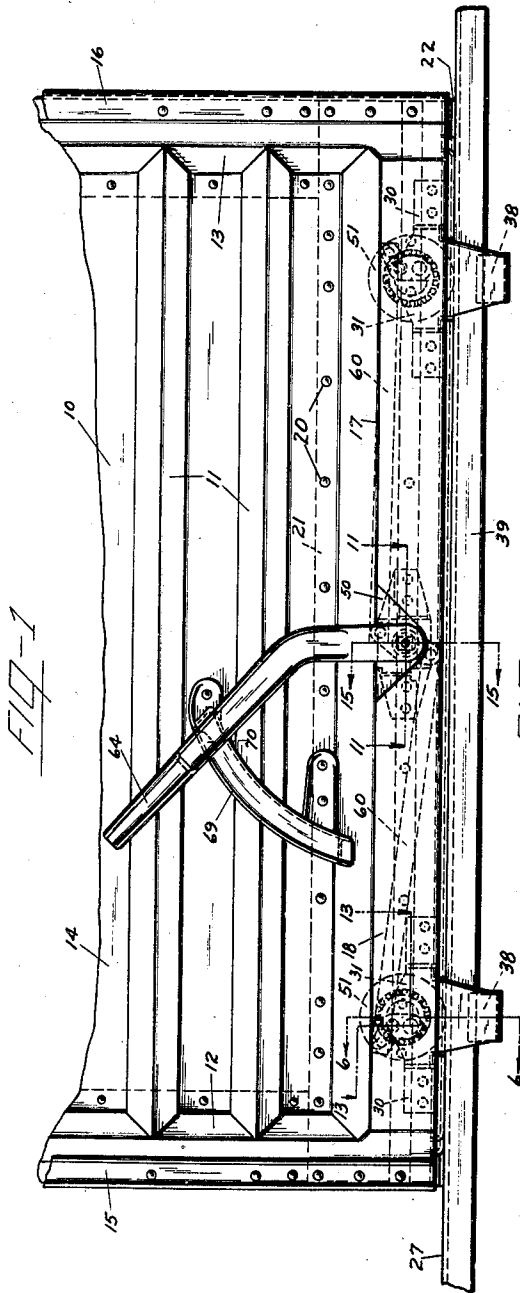
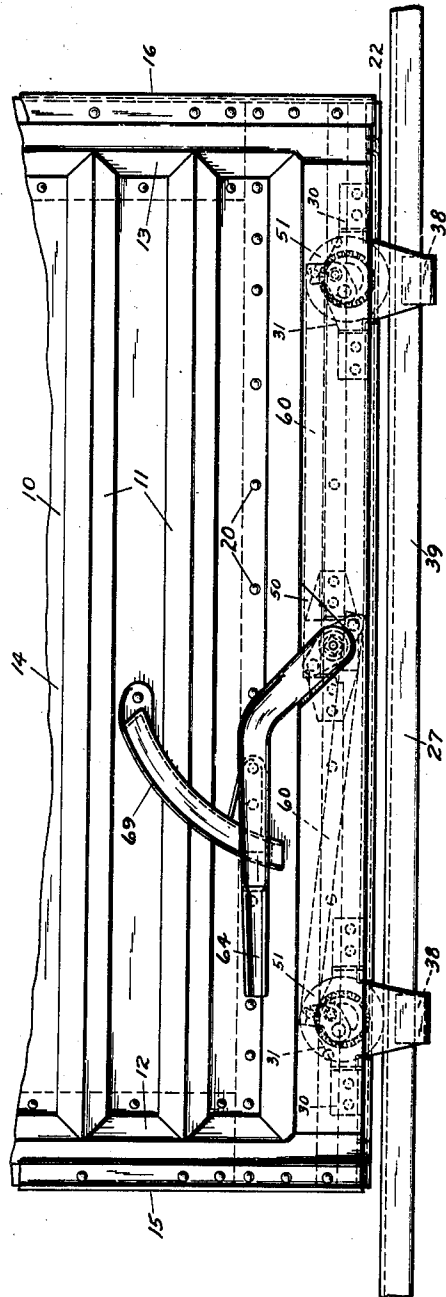
W. A. BEAUCHAMP

2,225,679

CAR DOOR

Filed Dec. 17, 1937

4 Sheets-Sheet 1



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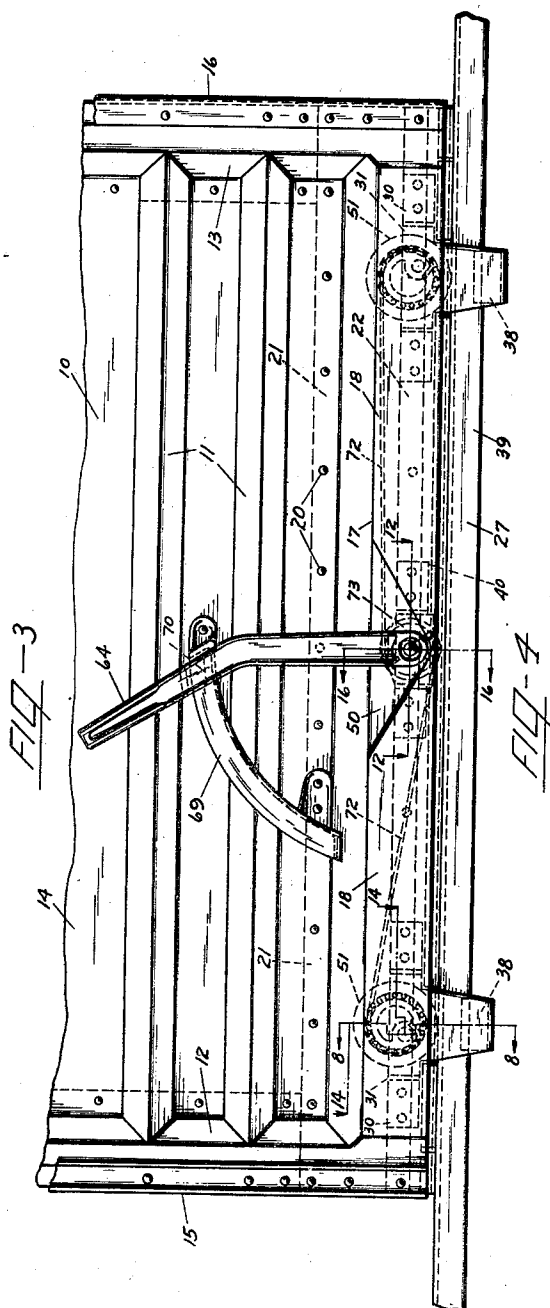
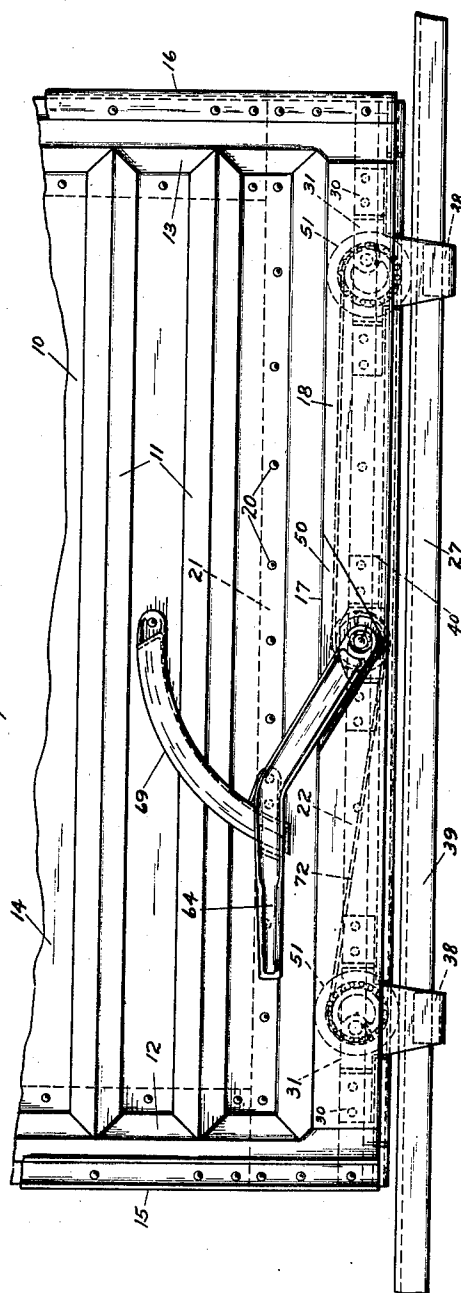
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4 Sheets-Sheet 2



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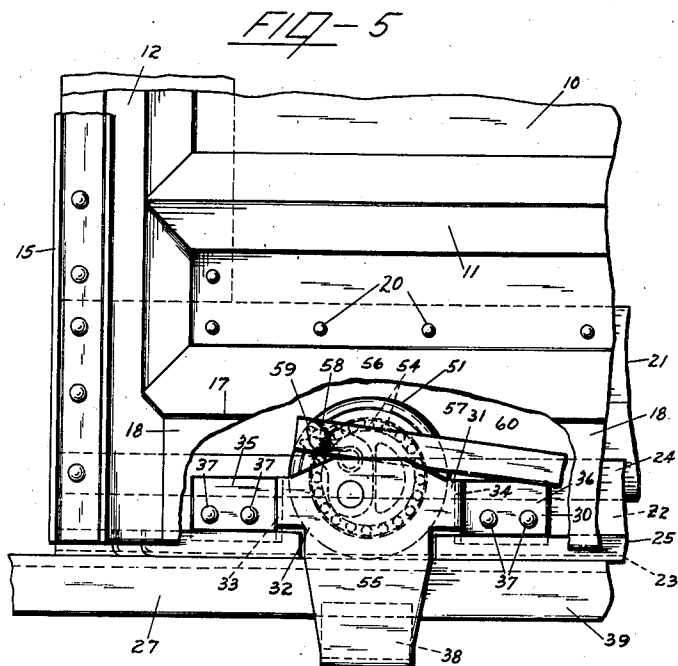
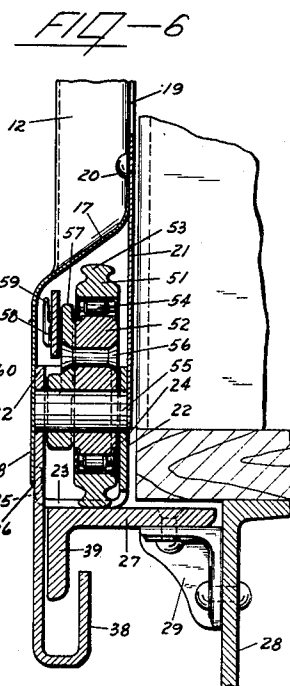
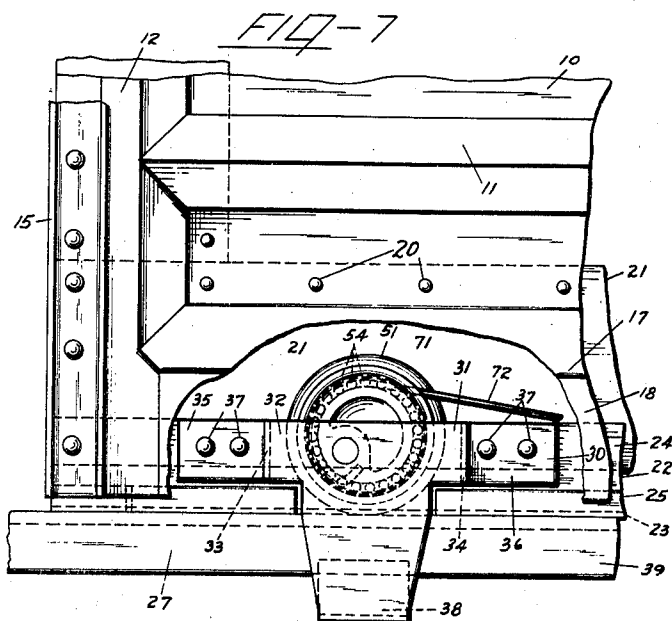
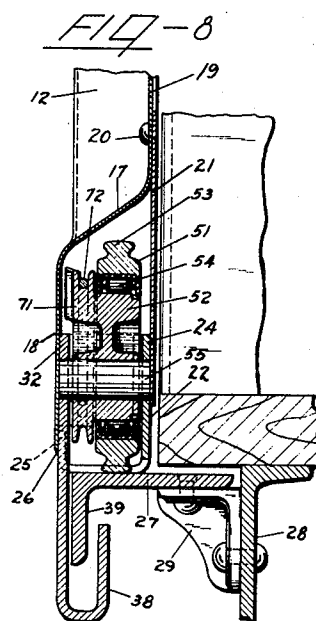
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CAR DOOR

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4 Sheets-Sheet 3



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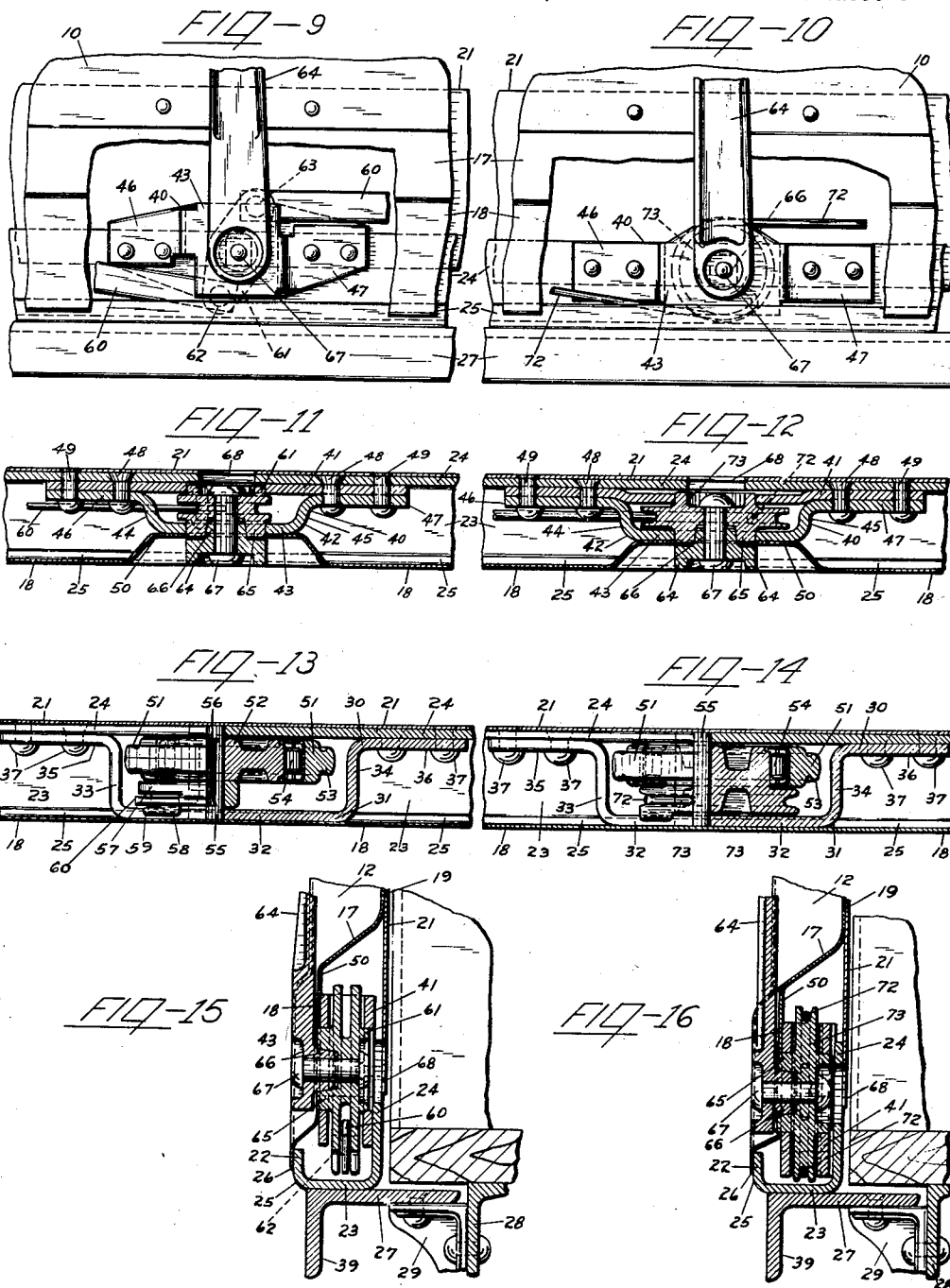
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,225,679

CAR DOOR

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Application December 17, 1937, Serial No. 180,382

5 Claims. (Cl. 20—22)

This invention relates to car doors and particularly to lift doors for railway freight cars.

It is an object of this invention to provide doors of the lift type for freight cars which shall be standard for all classes of house cars.

A further object is to provide lift doors for freight cars which shall effect a reduction in the overall width of cars between doors thereby obtaining disposition of the door lift fixtures outwardly of the main plane of the doors.

A further object is to provide lift doors in which the number of castings utilized is held to a minimum.

A further object is to provide lift doors where- in the lift fixture parts for the main and auxiliary doors of double door house cars are identical in construction.

A further object is to provide lift doors utilizing stamped, pressed or formed plate members in place of castings.

A further object is to provide lift doors having lift fixtures designed to obviate machining operations.

A further object is to provide lift doors having lift mechanism disposed wholly within the outermost plane of the doors.

A further object is to provide lift doors having fixtures embodying connecting means for insuring simultaneous operation of the fixtures wherein the connecting means shall be subject to tension rather than compression.

A further object is to provide lift doors having lift mechanism enclosed within a sturdy box section of the doors thus minimizing breakage of parts.

Other objects of the invention will become clear as the description thereof proceeds.

In the drawings forming part of this specification:

Figure 1 is a partial elevation of a lift door embodying one form of the invention, the door being shown in lowered position.

Figure 2 is a view similar to Figure 1, the door being shown in elevated position.

Figure 3 is a view similar to Figure 1, showing a modified form of the invention.

Figure 4 is a view similar to Figure 3, showing the door in elevated position.

Figure 5 is an enlarged fragmentary elevation of the door shown in Figure 1, a portion being broken away to illustrate more clearly parts of the lift mechanism.

Figure 6 is a vertical section taken on line 6—6 of Figure 1.

Figure 7 is a view similar to Figure 5 showing a modified form of the invention.

Figure 8 is a vertical section taken on line 8—8 of Figure 3.

Figure 9 is an enlarged fragmentary elevation having a portion broken away to clearly show the part of the lift mechanism illustrated in Figure 1 of the drawings.

Figure 10 is a view similar to Figure 9, showing the modified form of lift mechanism.

Figure 11 is a horizontal section taken on line 11—11 of Figure 1.

Figure 12 is a horizontal section taken on line 12—12 of Figure 3.

Figure 13 is a horizontal section taken on line 13—13 of Figure 1.

Figure 14 is a horizontal section taken on line 14—14 of Figure 3.

Figure 15 is a vertical section taken on line 15—15 of Figure 1.

Figure 16 is a vertical section taken on line 16—16 of Figure 3.

Referring to the drawings and more particularly to Figures 1, 2, 5, 6, 9, 11, 13, and 15 wherein one embodiment of the invention is illustrated, the reference numeral 10 designates generally a metallic door which may be provided with spaced horizontal corrugations 11 and marginal vertical corrugations 12 and 13 into which said horizontal corrugations merge. These horizontal and vertical corrugations are formed in the metallic panel 14 of the door, the vertical margins of which may be reinforced in any desired manner as by vertical stiffening members 15 and 16.

At its lower margin the metallic panel 14 is offset outwardly as indicated at 17 to provide a downwardly extending marginal portion or flange 18 disposed outwardly of the main plane 19 of the door. Secured to the main plane of the door as by means of rivets 20 above the outwardly offset portion 17 is a backing plate 21 which lies substantially in said main plane. The backing plate 21 is thereby disposed in spaced relationship with the flange 18 of the metallic panel.

A longitudinal member 22 substantially J-shaped in section extends substantially from end to end of the door. The member 22 presents a web 23 arranged horizontally from which the vertical legs 24 and 25 extend upwardly. The longer leg 24 lies against the backing plate 21 and is secured thereto in any desired manner as by rivets. Similarly the shorter leg 25 abuts the offset flange 18 of the metallic panel and is secured thereto preferably by means of spot welding as indicated at 26.

It will be apparent from the foregoing that the J-shaped longitudinal member 22 cooperates with the offset flange 18 of the metallic panel 14 and the backing plate 21 to provide a sturdy box section for the lower margin of the door.

Doors of the type considered are adapted in their lowered position to be frictionally supported upon a track. In the instant invention a track 27 is utilized, this track being supported from the side sill 28 of the car underframe by means of connecting brackets 29. Frictional engagement between the door and the track 27 in the lowered position of the door is secured through the longitudinal J-shaped member 22, the web 23 of which rests upon the track for this purpose.

To obtain movement of the door between open and closed positions with ease, mechanism embodying anti-friction means such as rollers is utilized. This mechanism functions initially to obtain a lifting movement of the door in order to release it from its frictional support upon the track and dispose the weight of the door upon the anti-friction means. In the instant invention such mechanism is disposed within and hence protected by the sturdy box section hereinabove described. To provide for the reception of such mechanism the box section is prepared so as not only to eliminate the heavy and expensive castings heretofore utilized in doors of the character considered but additionally to provide bracing means minimizing the danger of damage to the box section from external blows.

To this end adjacent the lower corners of the door members 30—30 which are identical in construction are utilized. Each of these members is fabricated from a plate which may be a stamping, pressed or otherwise formed to provide a channel shaped portion 31 comprising a web 32 abutting the offset flange 18 of the panel 14, flanges 33 and 34 extending inwardly therefrom and oppositely directed flanges 35 and 36 abutting and secured as by rivets 37 to the leg 24 of the J-shaped longitudinal member 22. The web 32 of the channel shaped portion 31 is extended downwardly as clearly shown in Figures 5 and 6 of the drawings and formed into a hook 38 overlapping the downwardly extending flange 39 of the track 27. The hook 38 cooperates with the flange 39 to guide and retain the door upon the track.

Intermediate the members 30 and within the box section hereinabove described a substantially tubular structure 40 is provided. As more clearly illustrated in Figure 11 of the drawings, the structure 40 comprises metallic plate 41 and a substantially channel shaped member 42 having a web 43 and inwardly directed flanges 44 and 45 from which extend oppositely directed flanges 46 and 47. The plate member 41 and substantially channel shaped member 42 are secured together as by rivets 48 and to the leg 24 of the member 22 and a backing plate 21 as by rivets 49. The web 43 bears against an inwardly offset portion 50 of the flange 18.

Each of the members 30 receives a roller 51 within the channel shaped portion thereof. Each of these rollers is in the form of an eccentric and embodies a core 52 and a rim 53 between which a roller bearing 54 is disposed. A pin 55 supported at its ends by the leg 24 of the member 22 and by the web 32 of the member 30 extends eccentrically through the core. Fastened to the core of each roller as by means of a rivet 56 is a connecting crank or flange member 57 formed with a lug 58 from which a flange 59

extends at right angles. A tension member preferably in the form of a metallic strap 60 is connected at one end to each core 52, this connection being effected by passing the lug 58 and flange 59 through an opening in said end of the tension member. The flange 59 guards against accidental disengagement of the strap member 60.

The strap members 60 are connected for simultaneous operation in such manner as to act in tension. For this purpose, a crank 61 is journaled in the plate member 41 and in the web 43 of the channel shaped member 40 as clearly illustrated in Figure 11 of the drawings. The strap member 60 extending from the left hand roller is pivotally connected to the lower end of the crank as indicated at 62 while the strap member 60 extending from the right hand roller is pivotally connected to the upper portion of the crank as indicated at 63.

Operation of the crank or strap actuating member 61 is obtained by means of a lever 64 which is wedgingly engaged with the crank 61 so as to avoid slack or clearance between these parts and to eliminate machining operations. As illustrated, the crank 61 is provided with a hub 65 preferably square in section, the sides of which taper inwardly. The lever 64 is formed with a boss 66 of the same section as the hub and having inwardly tapered sides. The desired relationship between the lever and the crank 61 is obtained by means of a rivet 67 passing through the boss and the hub of the crank thereby drawing the lever and the crank into tight wedging engagement. To permit driving of the rivet 67 the backing plate, leg 24 and plate member 41 are apertured as indicated at 68.

It will be observed from Figures 1 and 11 of the drawings that the lever 64 while lying upon the outside of the offset flange 18 is nevertheless within the outermost plane of said flange and door by reason of its disposition within the recessed portion 50 of the flange 18. By this construction no part of the lifting mechanism including the lever projects outwardly beyond the door and protection is consequently afforded this mechanism.

In the movement of the door from its closed and lowered frictional position upon the track 27 the operating lever 64 is pulled downwardly counterclockwise as viewed in Figure 1 of the drawings. This movement of the lever is guided by means of a quadrant 69 fastened upon the panel of the door and received between the outer portion of the lever and a lip 70 disposed inwardly of the lever. The downward movement of the lever 64 produces rotation of the crank 61 which in turn exerts simultaneous pull upon the connecting straps 60. These straps cause the cores 52 of the rollers 51 to rotate within the rims 53 and due to the eccentricity of the cores to impart lifting movement to the door. At this time the door has been raised above the track and its weight disposed upon the rollers and the door may easily be opened. During the opening movement of the door the cores 52 will remain stationary and the rims 53 will rotate about said cores. Upon release of the lever 64 the door will automatically seat itself upon the track thereby relieving the rollers of the weight of the door.

In the embodiment of the invention illustrated in the remaining figures of the drawings connecting cables are utilized in place of the strap plate members 60. In this embodiment of the inven-

tion the cores 52 of the rollers 51 are each provided with a drum 71 to which one end of a cable 72 is secured. The other ends of the cables 72 are fastened to a drum 73 journaled in the substantially channel shaped structure 40 as hereinabove described in connection with the description of the first embodiment of the invention. A lever 64 is also employed in the considered embodiment of the invention and is constructed, related and fastened to the drum 73 as in the hereinabove described embodiment. Inasmuch as the ends of the cable 72 bear the same relationship to the winding drum 73 as the ends of the strap member 60 bear to the crank 61, it will be apparent that upon counterclockwise movement of the operating lever 64 tension will be applied to the cables and elevating movement will be imparted to the door. The weight of the door will then be disposed upon the rollers for easy movement. Upon release of the lever 64 the door will gravitate into frictional engagement with the track and relieve the rollers of the weight of the door.

It will be noticed that the preparation of the box section at the lower margin of the door for the reception of the cable type of lift mechanism is substantially identical with that for the reception of the strap plate type of lift mechanism. The utility and advantages of the latter preparation are found as well in the former. Moreover, not only does the invention secure identity of parts upon a single door but this advantageous result is obtained as well upon the auxiliary door utilized with double door constructions.

It will be apparent, moreover, that the instant invention lends itself to accurate sub-assembly inasmuch as the backing plate 21, J-shaped member 22 and the lifting mechanism and its associated parts with the exception of the operating lever may be assembled as a unit and subsequently applied to the door. By this means accuracy is insured.

It will be apparent that numerous changes and modifications in the details in the invention will be clear to those skilled in the art. It is intended, therefore, that all such modifications and changes be comprehended within this invention, which is to be limited only by the scope of the claims appended hereto.

I claim:

1. A lift door comprising a metallic panel having a portion offset outwardly of the main plane of said panel, lift mechanism disposed between said main plane of the panel and said outwardly offset portion, said mechanism comprising a lever, said outwardly offset portion of said panel being

recessed inwardly and said lever being positioned within said recess.

2. A lift door comprising a metallic panel having a portion offset outwardly of the main plane of said panel, a metallic plate substantially in the main plane of said panel, a longitudinal metallic member secured to said plate and said offset portion to form a box section and lift mechanism disposed in said box section, said mechanism comprising an operating lever positioned upon the outside and inwardly of said offset portion.

3. A lift door comprising a metallic panel having a portion offset outwardly of the main plane of said panel, a metallic plate substantially in the main plane of said panel, a longitudinal metallic member secured to said plate and said offset portion to form a box section and lift mechanism disposed in said box section, said mechanism comprising an operating lever positioned upon the outside and inwardly of said offset portion, said member being adapted to have frictional engagement with a door supporting track in the lowered position of said door.

4. A lift door comprising a metallic panel having a depending portion offset outwardly of the main plane of said panel, a metallic plate substantially the length of said panel secured thereto and lying substantially in the main plane thereof, a longitudinal metallic member substantially the length of said panel secured to said plate and said offset portion to form a box section, pressed channel shaped members secured to said metallic member and extending therefrom to said offset portion for reinforcing the latter and lift mechanism for said door comprising door supporting rollers disposed within said channel members and means journaled in said longitudinal member and said channel members for eccentrically mounting said rollers.

5. A lift door comprising a metallic panel having a depending outwardly offset lower portion recessed inwardly, a metallic plate lying substantially in the main plane of and secured to said panel, a longitudinal metallic member secured to said plate and said offset portion of said panel to form a box section, channel shaped members secured to said metallic member and extending therefrom to said offset portion for reinforcing the latter, and lift mechanism disposed in said box section, said mechanism comprising eccentrically mounted rollers positioned in said channel member and an operating lever positioned in said recess.

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