May 13, 1958 W. A. BEAUCHAMP 2,834,067

BOX CARS AND DOORS THEREFOR

Filed Feb. 20, 1956 6 Sheets-Sheet 1

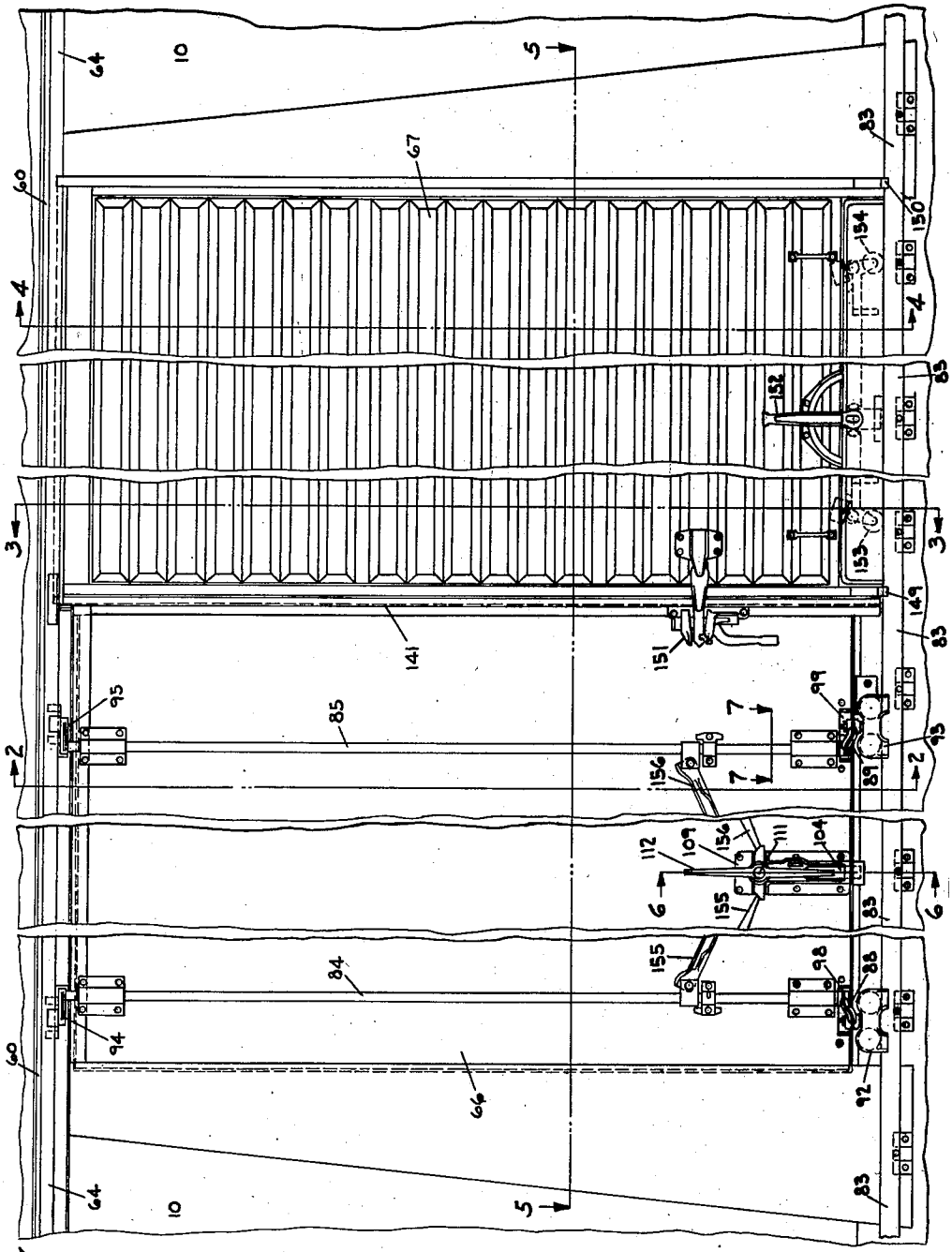


FIG-1

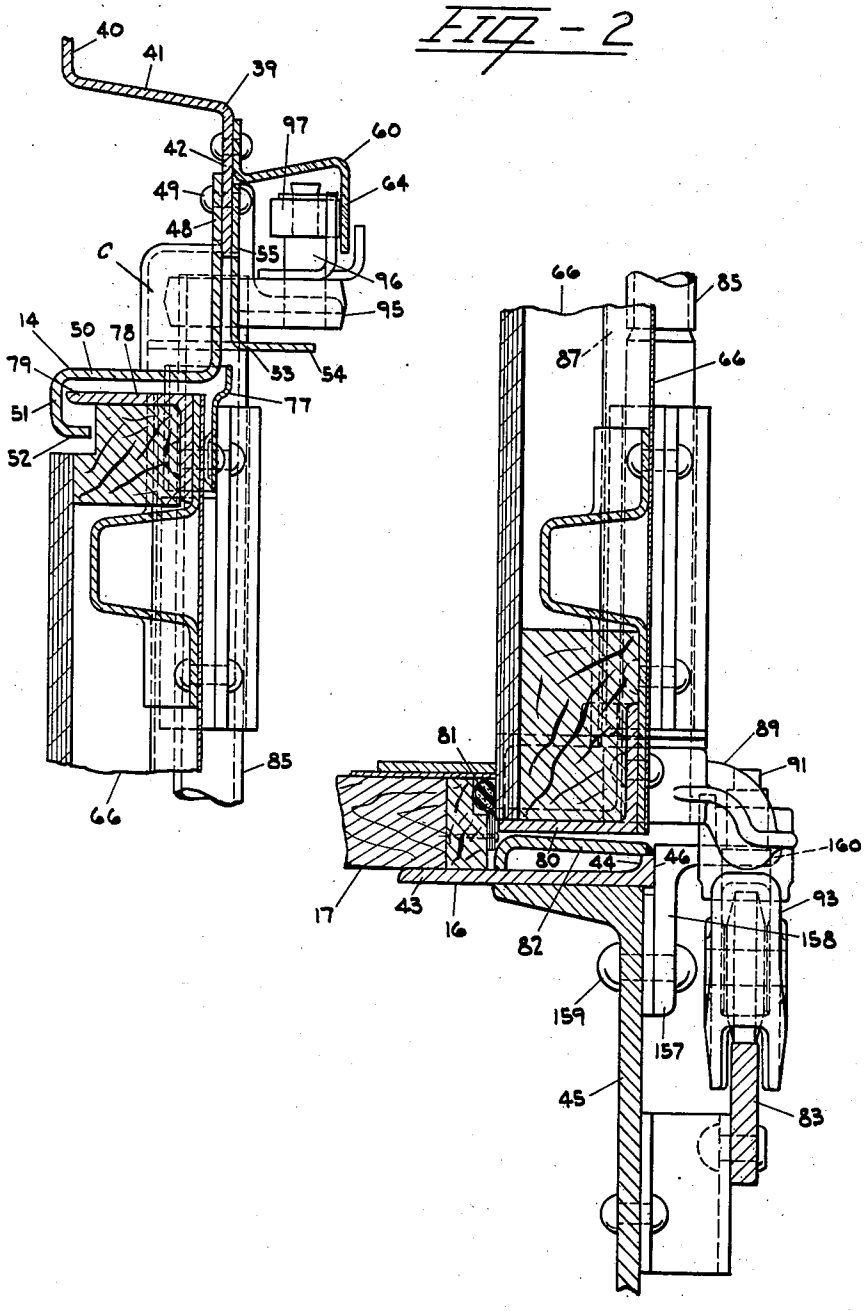
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BOX CARS AND DOORS THEREFOR

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FIG - 2



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BOX CARS AND DOORS THEREFOR

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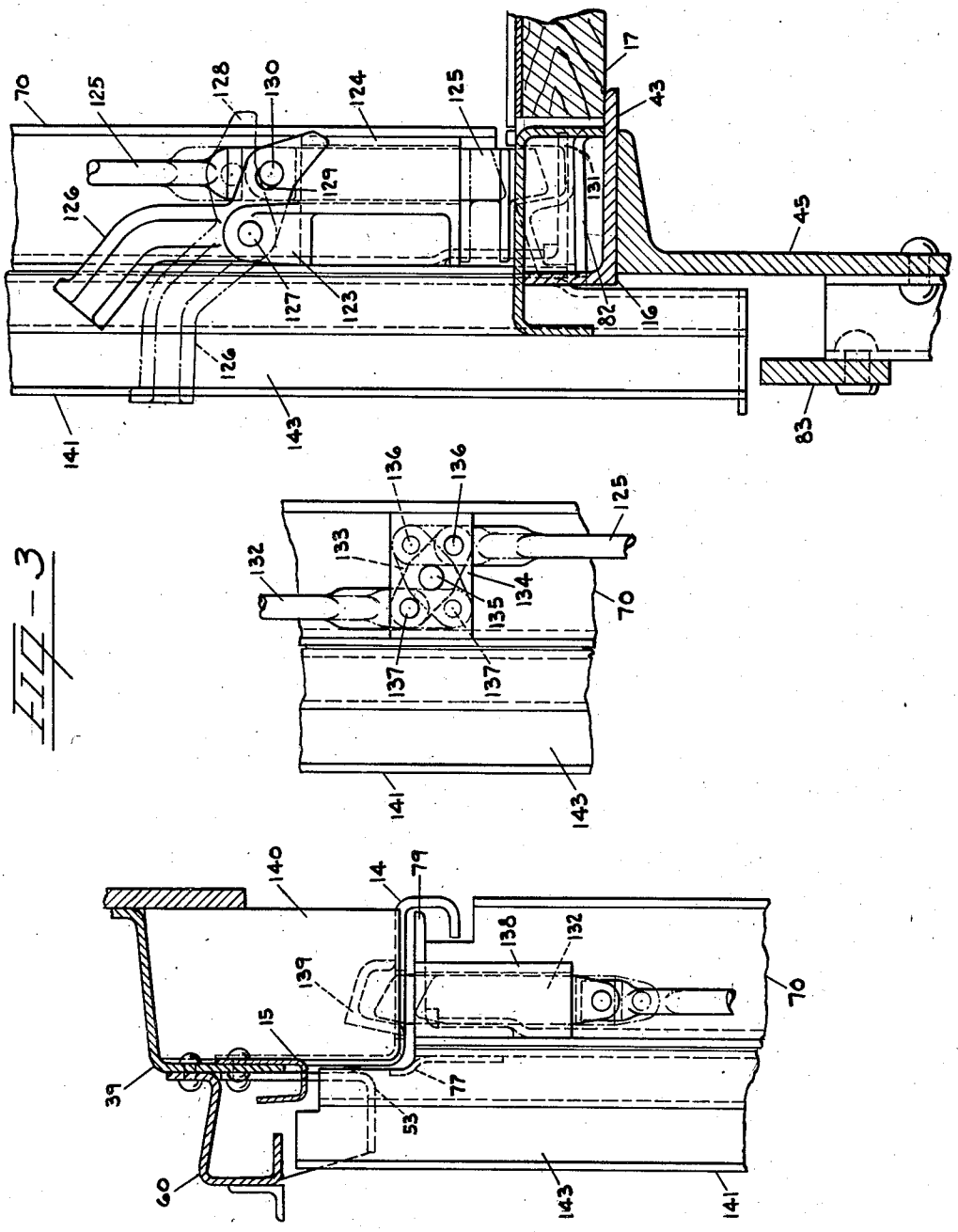


FIG. 3

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BOX CARS AND DOORS THEREFOR

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FIG-4

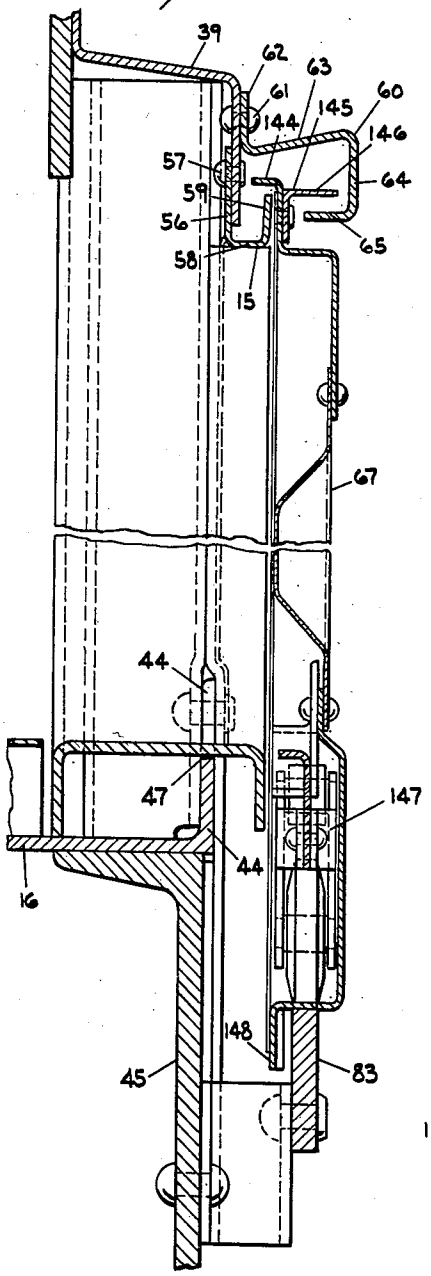
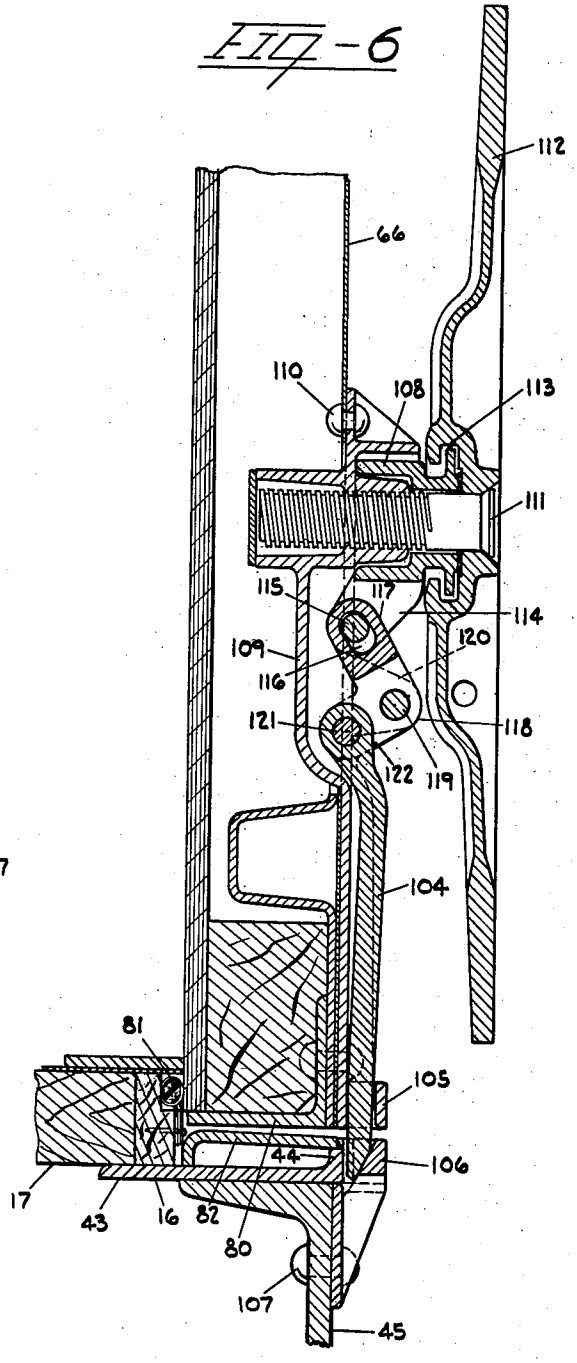


FIG-6



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BY Samuel Rose

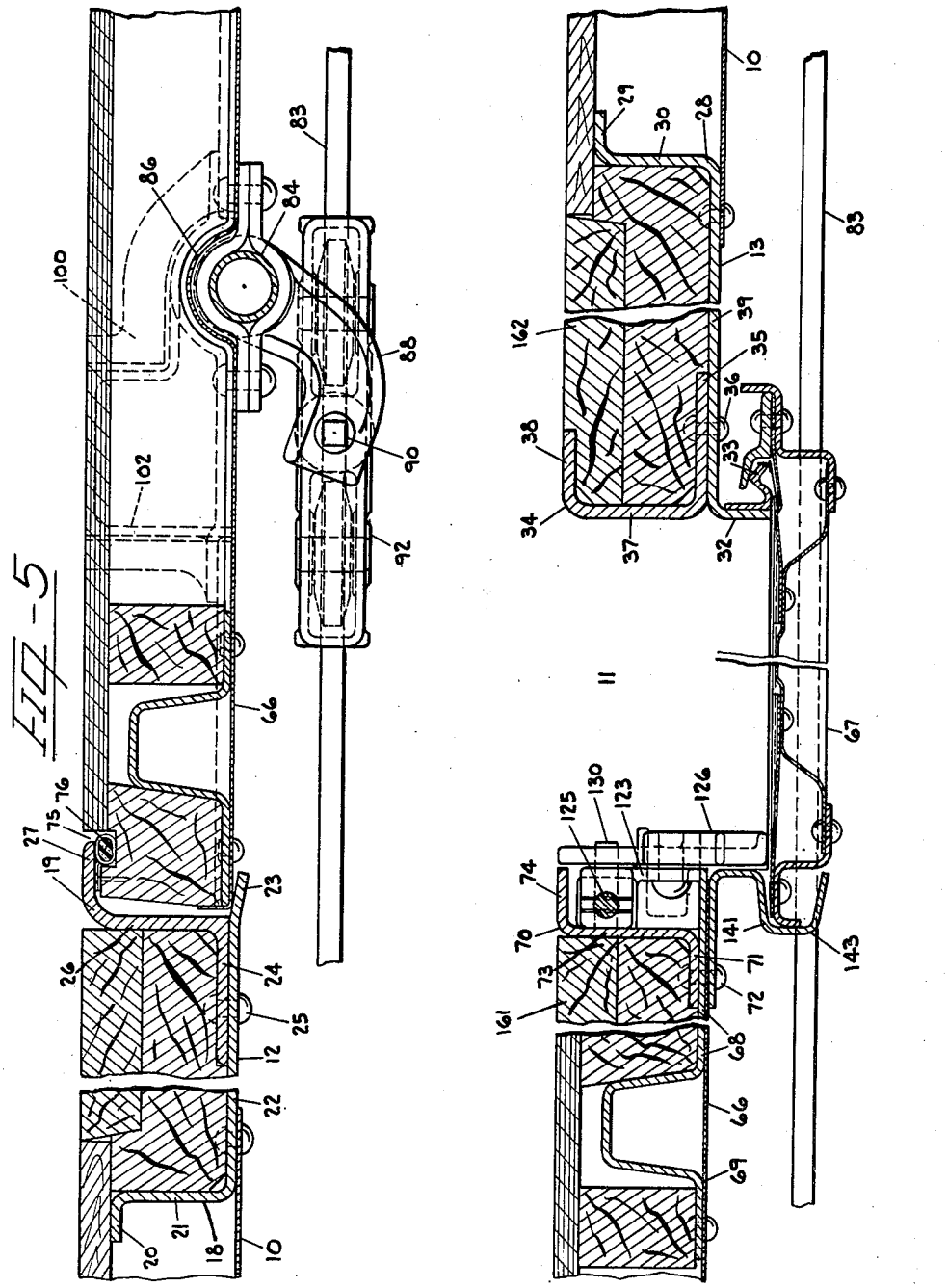
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BOX CARS AND DOORS THEREFOR

Filed Feb. 20, 1956 6 Sheets-Sheet 5

FIG. 5



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May 13, 1958 W. A. BEAUCHAMP 2,834,067

BOX CARS AND DOORS THEREFOR

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FIG-7

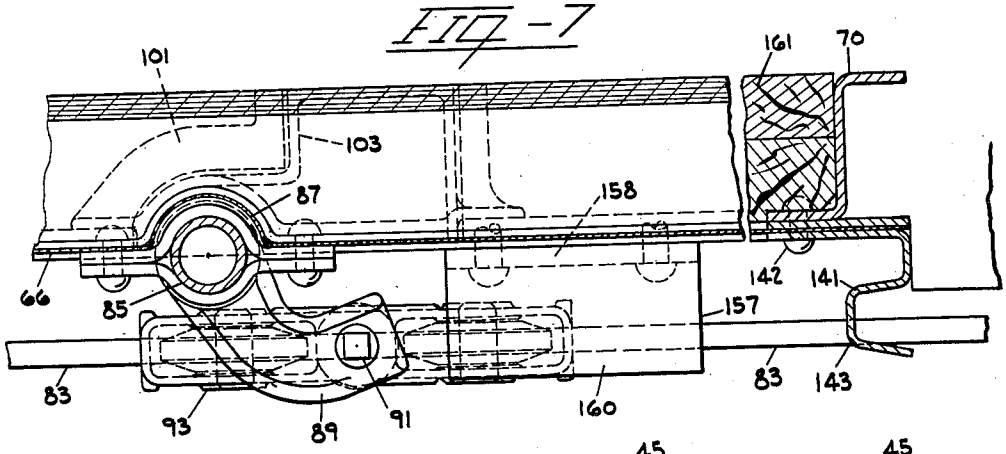
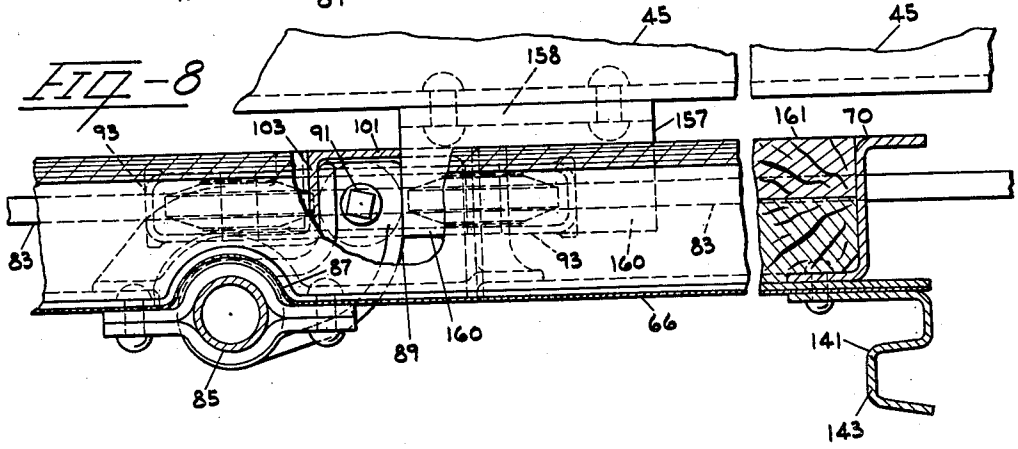


FIG-8



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United States Patent Office 2,834,067 Patented May 13, 1958

2,834,067

BOX CARS AND DOORS THEREFOR

Wilfred A. Beauchamp, Chicago, Ill., assignor to The Youngstown Steel Door Company, Cleveland, Ohio, a corporation of Ohio

Application February 20, 1956, Serial No. 566,419

20 Claims. (Cl. 20—23)

This invention relates to box cars and doors therefor and more particularly to doors which cooperate to close wide door openings provided in the side walls of box cars.

Box cars have heretofore been provided with door openings of such width as to require two doors to close the openings. Door openings measuring up to approximately 16 feet in width have been used so that commodities which are bulky or of large size could be moved into and out of box cars with a maximum of convenience and speed. However, the accomplishment of this end, desirable as it is, could heretofore not be achieved without the introduction of an attendant evil. It severely restricted the long-sought for general purpose utility of box cars by substantially inhibiting these box cars from use as carriers of certain commodities, particularly grain, and thereby substantially diminishing their revenue-producing capacity.

It is therefore an object of this invention to provide box cars and sliding doors therefor of such construction and so related that wide door openings can be provided in the side walls of the cars without precluding the shipment of these commodities in them.

A further object is to provide box cars having wide door openings in the side walls thereof and double sliding doors for the door openings so constructed and related that grain can successfully be shipped in such cars without increasing the cost of grain doors normally required in the shipment of grain over the cost of grain doors used in box cars having door openings of normal width requiring single doors.

A further object is to provide box cars having wide door openings in the side walls thereof and double sliding doors for the door openings so constructed and related that grain and other commodities can successfully be shipped in such cars and certain of the double doors can be secured to the side walls so as to become extensions thereof and reduce the door openings to normal width adapted to be closed by the other of the double doors.

A further object is to provide box cars having wide door openings in the side walls thereof and double sliding doors for the door openings so constructed and related that grain and other commodities can successfully be shipped in such cars and certain of said doors can be mounted for sliding movement on the outside of the cars and be adapted to be seated in the door openings so as to be flush with the inside and the outside of the side walls.

A further object is to provide constructions of the character described immediately above wherein locks are provided which shall secure the sliding flush doors to the side walls against the pressure of grain in the cars.

A further object is to provide constructions of the character described immediately above in which the sliding flush doors shall carry operating mechanism for forcing the doors into and out of the door openings and wherein the operating mechanism shall be operatively connected with certain of the door locks so as to automatically actuate them.

A further object is to provide box cars having wide door openings in the side walls thereof and double sliding

doors for the door openings so constructed and related that grain and other commodities can successfully be shipped in such cars and certain of said doors can be mounted for sliding movement on the outside of the cars upon tracks that are parallel to the side walls and be adapted to be seated in the door opening so as to be flush with the inside and the outside of the side walls while the rear edge of the doors are retained against the pressure of grain in the cars by means fixedly secured to the carside and overlapping the rear edge of the doors.

A further object is to provide pairs of sliding doors for box cars wherein one door of each pair shall be adapted to be disposed flush with the inside and outside of the side walls of the cars and other door of each pair shall at all times lie upon the outside of the side walls, each pair of doors being movable longitudinally on the outside of the side walls upon a single track which is parallel to the side walls.

A further object is to provide freight cars of box car design having wide door openings in the side walls thereof adapted to be closed by pairs of sliding doors wherein the cars although of box car design are so constructed that one of each pair of doors can be flush with the inside and outside of the side walls when closed.

A further object is to provide constructions of the character described immediately above wherein the front edge of the flush sliding doors shall carry locking means for securing the doors to the cars above and below the door openings.

A further object is to provide constructions of the character described immediately above wherein the locking means shall be covered by the other door of each pair and wherein the latter doors shall be so related to the locking means as to insure locking of the flush doors and to prevent accidental unlocking of the flush doors.

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

In the drawings forming part of this specification:

Fig. 1 is a fragmentary elevation of a side wall of a railway box car so constructed as to embody the instant invention.

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1, this section being shown in two parts so as to obtain a view of greater size.

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1 with the door omitted, this section being shown in three parts so as to obtain a view of greater size.

Fig. 4 is a vertical section taken on line 4—4 of Fig. 1, an intermediate portion being broken away so that the view can be shown on a large scale.

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 1, this section being shown in two parts so as to obtain a larger view.

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

Fig. 7 is a horizontal section taken on line 7—7 of Fig. 1.

Fig. 8 is a horizontal section similar to Fig. 7 but showing the door moved laterally out of the door opening.

The instant invention provides side walls for box cars, one of which is shown fragmentarily in Fig. 1 of the drawings and is designated by the reference numeral 10. Each side wall of the box car is provided with a wide door opening 11 which in the illustrated embodiment of the invention is approximately 16 feet in width. The door opening 11 is defined by the left-hand door post 12, the right-hand door post 13, the headers 14 and 15 and the side sill 16 and floor 17.

The left-hand door post 12 is formed of two substantially Z-shaped members 18 and 19. Z-shaped member 18 has an inner flange 20 arranged parallel with the side wall, an outwardly extending web 21 and an outer longitudinally extending flange 22 which is parallel to the side

wall. The flange 22 is extended into the door opening and flared outwardly as indicated at 23 for a purpose which will hereinafter appear. The Z-shaped member 19 of the door post 12 has an outer longitudinally extending flange 24 disposed inwardly of and secured as by means of rivets 25 to the flange 23, an inwardly extending web 26 and an inner longitudinal flange 27 which extends into the door opening 11 in opposed spaced relationship to the portion 23 of flange 22. The web 26 and the flanges 23 and 27 thereby provide a substantially channel-shaped member.

The right-hand door post 13 is formed of a substantially Z-shaped member 28 having an inner longitudinal flange 29, an outwardly extending web 30, and an outer longitudinally extending flange 31 which lies substantially in the outer plane of the side wall 10. Flange 31 is turned outwardly as shown at 32 and serves as a support for a door sealing strip 33 which is secured thereto in any desired manner. The door post 13 also comprises a substantially channel-shaped member 34 having an outer longitudinal flange 35 secured to the inside of flange 31 as by means of rivets 36, an inwardly extending web 37 and an inner longitudinal flange 38. The flanges 35 and 38 of the door post member 34 are turned away from the door opening.

The side plate of each side wall is formed of the usual Z-shaped member 39 which is disposed with an inner upstanding flange 40, an outwardly extending web 41 and an outer depending flange 42.

The side sill 16 of each side wall is in the form of an angle member arranged with one flange 43 extending inwardly horizontally and the other flange 44 extending upwardly substantially in the outer plane of the side wall. The side sill is preferably reinforced by means of a channel-shaped member 45 which is secured in any desired manner to the horizontal flange 43. As shown in Fig. 2 of the drawings the flange 43 extends inwardly a sufficient distance to provide a support for the adjacent ends of the floor 17.

Beyond the door opening 11 the upstanding flange 44 of the side sill 16 retains its full height. Within a portion of the door opening and extending from the door post 12 the flange 44 is reduced in height as indicated at 46 so that it terminates substantially below the upper surface of the floor 17. From this portion of the flange 44 and extending to the door post 13 the flange 44 is reduced in height as shown at 47 so as to lie substantially in the upper plane of the car floor.

Each side wall of the box car includes the door headers 14 and 15. The door header 14, which extends from the door post 12 and is substantially of the same length as the reduced portion 46 of side sill flange 44, embodies a flange 48 secured to the depending flange 42 of the side plate as by means of rivets 49. A substantially horizontal flange 50 extends inwardly from the lower end of the vertical flange 48. The flange 50 is turned downwardly to provide a vertical flange 51 which lies substantially in the inner plane of the side wall 10. Flange 51 is turned outwardly to provide a flange 52 which is spaced below flange 50 and cooperates therewith and with flange 51 to provide a substantially channel-shaped portion for a purpose which will hereinafter appear. A weather guard angle 53 is secured to the outer face of the depending flange 42 of the side plate by means of the rivets 49. The weather guard embodies an outwardly extending flange 54 and the attaching flange 55. The weather guard angle 53 is substantially co-extensive with the header 14.

The header 15 extends substantially from the header 14 to the right hand door post 13. Header 15 is substantially J-shaped in section and embodies a vertical flange 56 secured to the inner face of the side plate flange 42 as by means of rivets 57, a substantially horizontal flange 58 which extends outwardly beyond side plate flange 42 from the lower end of header flange 56 and an upstanding flange 59 spaced outwardly from the side plate flange 42.

A continuously extending door retainer 60 is secured as by means of rivets 61 to the outer face of the depending flange 42 of the side plate 39. The door retainer embodies a vertical attaching flange 62, an outwardly and upwardly extending web 63 and a depending flange 64. The door retainer 60 extends across the door opening and beyond each side thereof for a distance equal to the travel of the doors hereinafter described. For a portion substantially co-extensive with the header 14 the section of the door retainer is as shown in Fig. 2 of the drawings. Beyond this and for the remainder of the length of the door retainer the outer vertical flange 64 is turned inwardly to provide a flange 65 which is spaced below the web 63.

Heretofore it has been customary to utilize two doors in order to close side door openings of extraordinary width. Prior to the instant invention such doors were always mounted for longitudinal movement upon the outside of the side walls of box cars. With such doors the utility and revenue producing capacity of the box cars were restricted because of the fact that certain commodities, such as packaged goods, and particularly bulk materials such as grain, could not be shipped in them. By virtue of the instant invention these restrictions are removed and the all-purpose utility of box cars has been substantially increased. To this end the instant invention provides a pair of sliding doors 66 and 67 closing the door opening in each side wall of box cars. The left-hand door is known as the auxiliary door and the right-hand door as the main door.

In accordance with the instant invention the auxiliary door 66 is a flush door and is preferably equal in thickness to the side wall of the car. The auxiliary door may be of any desired construction, one embodiment being illustrated in the drawings. However, it is preferred that the front edge of the auxiliary door embody a substantially channel construction. As illustrated the channel construction is provided by the outer flange 68 of a door reinforcing member 69 and a Z-shaped member 70. The latter member comprises an outer longitudinally extending flange 71 which is secured as by means of rivets 72 to the inside of the flange 68 which lies substantially in the outer plane of the door. Z-shaped member 70 also embodies an inwardly extending web 73 and an inner longitudinally extending flange 74 which is directed toward the portion of the door opening which is closed by means of the main door 67. The Z-shaped member 70 is so disposed that the web 73 and flange 74 thereof cooperate with the flange 68 to provide the channel-shaped construction.

The rear edge of the door, as shown in Fig. 5 of the drawings, is rabbeted as indicated at 75 in order to receive the inner longitudinal flange 27 of the Z-shaped member 24 of the door post. In this manner the inner face of the side wall lies flush with the inner face of the auxiliary door when the latter is closed. A sealing strip 76 is secured to the rabbeted portion of the auxiliary door and is adapted to bear against the flange 27 when the door is closed in order to seal the rear edge of the door and to prevent loss of grain from the car.

The top edge of the auxiliary door 66 carries a weather plate 77 which is adapted to overlap the door header 14. The top edge of the door also carries an angle member 78 provided with an inwardly extending flange 79 which projects into the channel formation formed along the inner edge of the header 14. An additional weather seal is thereby provided at the top edge of the door as is shown more clearly in Fig. 2 of the drawings.

The lower edge of the auxiliary door is reinforced by means of angle member 80 and is adapted to bear against a sealing strip 81 secured to the floor 17 of the car. As shown in Fig. 2 of the drawings the lower edge of the door

lies above the side sill 16 and an angular reinforcing plate 82 which serves to restore the strength of the portion of the side sill having the short upstanding flange 44. By reason of the side sill construction hereinabove described the auxiliary door is adapted to be seated within the door opening so that the inner and outer faces thereof are flush with the inner and outer faces of the side wall.

A door track 83 and operating mechanism are provided whereby the door is supported for lateral movement into and out of the door opening and for longitudinal movement upon the track. In order to prevent encroachment of the auxiliary door beyond the clearance line and to permit the use of a single track for both the auxiliary and main doors the operating mechanism comprises vertical pipes 84 and 85 journalled in recesses 86 and 87 formed in the door. Arms 88 and 89 are welded to the lower ends of the pipes 84 and 85. The ends of the arms remote from the pipes carry spindles 90 and 91 which are journalled in roller carriages 92 and 93 supported upon the track 83. It will be apparent that the pipes in combination with the arms and the spindles provide crank members for the lower ends of the pipes.

Cranks are similarly provided at the upper ends of the pipes 84 and 85. For this purpose arms 94 and 95 which lie above the door opening are welded to the upper end of the pipes which also extend above the door opening. To permit this extension of the pipes and provide space for the movement of the ends of the arms 94 and 95 during inward and outward movement of the door the header 14 and the weather guard angle 53 are recessed as shown in Figs. 1 and 2 of the drawings. These recesses are covered and the side plate structure reinforced by castings which span the recesses and are secured to the header in any desired manner. One of these castings is illustrated in Fig. 2 and is designated by the reference letter C. The remote ends of these arms carry spindles, one of which is illustrated at 96. The upper portions of the spindles are reduced in diameter so that rollers, one of which is shown at 97, may be mounted upon the spindles. These rollers bear against depending flange 64 of the door retainer to guide and retain the upper portion of the door upon the side wall.

To impart movement to the auxiliary door into and out of the door opening the operating mechanism disclosed in applicant's Patent No. 2,658,243, granted November 10, 1953, and incorporated herein by reference, is employed.

For the purpose hereinabove stated of disposing the auxiliary door within the tunnel clearance line and of permitting the use of a single track which is parallel to the side wall throughout its length for both the main and auxiliary doors the crank arms 88 and 89 which heretofore were positioned below the lower edge of the door are in accordance with applicant's invention so positioned that they extend above the lower edge of the door. To secure operation of the crank arms 88 and 89 for their intended purpose the lower margin of the auxiliary door is recessed adjacent to the pipes 84 and 85 as indicated at 98 and 99. The inner end of each of the recesses is closed by means of castings 100 and 101 which embody substantially channel-shaped portions 102 and 103 adapted to receive the remote ends of the arms 88 and 89 when the auxiliary door has been moved laterally out of the door opening. The relationship between the remote portion of each crank arm and the adjacent casting disposed in the recess of the door is clearly illustrated in Fig. 8 of the drawings.

It will be apparent from Fig. 5 of the drawings that when the flush auxiliary door is fully closed its rear marginal portion is overlapped by the extension 23 of the door post flange 22 so as to securely retain this portion of the door against the pressure of grain in the car.

Additional locking means is provided for securely retaining the flush door within the door opening. Such locking means for the lower middle portion of the door is illustrated in Fig. 6 of the drawings. It embodies a slidable locking bolt 104 retained upon the door by means of a guide bracket 105 and received within a keeper 106 secured as by means of rivets 107 to the side sill reinforcement 45. The locking bolt 104 is operatively associated with a follower 108 which is part of the door operating mechanism and which is slidably mounted upon an internally threaded casting 109 secured to the door as by means of rivets 110 and upon an externally threaded screw member 111 associated with the casting 109. The double handled actuating lever 112 of the door operating mechanism is rotatably interlocked with the follower as indicated at 113. The follower 108 is provided with spaced ears 114 which support a pin 115 that extends through a slot 116 formed in the upper arm 117 of a crank member 118. The crank member is swingably mounted upon a pin 119 which is carried by spaced ears 120 formed on the casting 109. The upper end of the sliding bolt 104 is pivoted upon a pin 121 carried by the lower arm 122 of the crank member 118.

Locking mechanism is also provided for the front edge of the auxiliary flush door. Where as is preferred a channel construction is provided on the front edge of the auxiliary door, the locking mechanism therefor is seated within the channel construction. This locking mechanism which secures the entire front edge of the door to the side wall embodies a casting 123 secured within the channel construction in any desired manner. This casting embodies a guide portion 124 which slidably receives a locking bolt 125. An actuating lever 126 is pivoted as indicated at 127 to the upper portion of the casting 123. The inner end 128 of the actuating lever is provided with an opening 129 through which a pin 130 provided on the locking bolt extends. By this construction the lever 126 when moved upwardly to the full line position illustrated in Fig. 3 of the drawings forces the slidable locking bolt 125 into engagement with a keeper 131 secured in any desired manner to the side sill of the car thereby locking the lower portion of the front edge of the door to the side sill.

The movement of the locking bolt 125 is transmitted to a similar locking bolt 132 for locking the upper portion of the front edge of the door to the header 14. For this purpose a link 133 is pivoted to the channel construction at the front edge of the door and to a plate member 134 welded to this channel construction by means of a pin 135 disposed intermediate the ends of the link. One end of the link is pivotally secured to the locking bolt 125 as is shown at 136 and the other end of the link is pivotally engaged with the locking bolt 132 as indicated at 137.

A guide casting 138 is secured to the upper end of the channel construction at the front edge of the auxiliary door in any desired manner. This casting serves to guide the upper end of the locking bolt 132 into a keeper 139 secured as by means of welding upon the door header 14. To provide support for the inner end of the header a plate member 140 is secured as by means of welding to the web and depending flange of the side plate and to the inner end of the header. The actuating lever 126 is disposed sufficiently near the lower edge of the door so that it can be actuated from the ground as well as from a platform.

In addition to the channel construction the forward marginal portion of the auxiliary sliding flush door 66 carries a front stop member 141 which is secured to the door as by means of rivets 142 and serves to limit the closing movement of the main door 67. In its closed position the latter door is received within a channel shaped portion 143 of the front stop as illustrated in Fig. 5 of the drawings.

As indicated hereinabove the main door 67 at all times lies upon the outside of the side wall 10 and is supported

for longitudinal movement relative to the side wall upon the track 83 which supports the auxiliary sliding flush door. The structure of the main door is well known and does not require detailed description. It may be noted, however, that the main door is provided with an upper inwardly extending flange 144 which overlaps the J-shaped header 15 when the door is closed and an angle member 145 which has an outwardly extending flange 146 lying above and in overlapping relationship with the inturned flange 65 of the header 60 for the main and auxiliary doors to prevent disengagement of the upper portion of the main door from the door retainer when the door is in open position.

The main door 67 is preferably of a lift type and for this purpose embodies lifting mechanism 147 whose construction is well known. The main door is retained upon the track 83 by the flange 148 at the lower margin of the door and by clips 149 and 150. The flange 148 is disposed upon the inside of the track and the clips 149 and 150 lie upon the outside of the track.

The doors are shown in their closed position in Fig. 1 of the drawings. In this position the main door is secured to the auxiliary door by means of a lock 151 which may be of any desired construction. When the doors are opened they move in opposite directions. The main door moves toward the right and the auxiliary door moves toward the left. To open the doors the lock 151 is released and the lever 152 of the lift mechanism for the main door is swung toward the right thereby elevating the door upon the rollers 153 and 154 of the mechanism and the door is readily moved toward the right upon the track 83. The actuating lever 126 of the locking mechanism at the front edge of the auxiliary door is thereby exposed. The lever 126 is pulled downwardly thereby retracting the locking bolts 125 and 132 from their respective keepers and unlocking the front edge of the door. The actuating lever may be retained in its lower position by any desired means such as a wedge plate secured to the auxiliary door. Thereupon the double handled lever 112 of the operating mechanism for the auxiliary sliding flush door is rotated counter-clockwise. Rotation of this lever imparts outward sliding movement to the follower 108 with which it is rotatably interlocked and outward movement to the levers 155 and 156 which are pivotally secured to the rotatably mounted pipes 54 and 55 of the operating mechanism. Rotation is thereby imparted to these pipes and partial movement of the auxiliary door out of the door opening occurs. Simultaneously as the follower 108 slides outwardly it imparts outward swinging movement to the upper arm 117 of the crank member 118 about the pivot 119 and upward swinging movement to the arm 122 of the crank member. The upward swinging movement of this arm imparts upward movement to the sliding bolt 104 so as to effect disengagement of this bolt from the keeper 106 thereby automatically unlocking the middle portion of the door.

Thereupon the levers 155 and 156 are disengaged from the follower 108. The lever 156 is then swung toward the right as viewed in Fig. 1. The rotation thereby imparted to the pipe 85 moves the right-hand portion of the auxiliary door completely out of the door opening and at the same time effects longitudinal movement of the auxiliary door upon the track 83 toward the right so as to disengage the rear edge of the door from the flange 23. The lever 155 is then swung toward the left thereby completing the movement of the auxiliary door out of the door opening and disposing it for longitudinal movement toward the left to its full open position. In this manner the rear edge of the auxiliary door is automatically released from its locking engagement with the flange 23.

It will be observed from Fig. 8 of the drawings that when the auxiliary door has been moved out of the door opening the crank arm 89 abuts the casting 101. Similarly the crank arm 88 will engage the casting 102.

To close the door opening 11 the auxiliary sliding flush door 66 is first closed. To this end the auxiliary door is moved longitudinally toward the right upon the track 83 until the rear edge of the door passes the flange 23. Closing movement of the auxiliary door is limited by means of a stop member 157 which is in the form of an angle member whose vertically extending leg 158 is secured to the sill reinforcing member 45 as by means of rivets 159 and whose leg 160 is horizontal and extends outwardly. As shown more clearly in Fig. 8 of the drawings closing movement of the auxiliary door is stopped by the engagement of the outwardly extending leg 160 with the crank arm 89. Since the crank arm 89 abuts the casting 101 the impact to this arm is transferred directly to the sturdy casting so as to obviate impact and torsional stresses to the pipe 85 of the door operating mechanism.

When the auxiliary sliding flush door has assumed the position described immediately above the lever 155 is turned toward the right thereby imparting rotation to the pipe 84 and the crank arms 88 and 94 and movement of the rear portion of the door into the door opening. The lever 156 is then turned toward the left so as to impart rotation to the pipe 85. Rotation of the pipe 85 rotates the crank arms 89 and 95 and moves the right hand portion of the door into the door opening. At the same time crank arm 89 through its engagement with stop 157 imparts longitudinal movement toward the left to the auxiliary door so that the rear edge of the door moves behind the flange 23. Locking engagement between the rear edge of the door and this flange is thereby obtained. The levers 155 and 156 are then re-engaged with the follower 108 of the operating mechanism and the lever 112 is rotated clockwise to move the door into the door opening and compress the sealing strip 76 against the flange 27 of the Z-shaped post member 19 and the sealing strip 81 against the floor 17 of the car. Leakage of grain past the rear edge and the bottom edge of the auxiliary door is thereby prevented.

Rotation of the lever 112 in clockwise direction imparts sliding movement toward the door to the follower 108. The follower in turn imparts swinging movement to the upper arm 117 of the crank member 118 about the pivot 119 and downward swinging to the lower arm 122 of the crank member. This movement of the crank member forces the sliding locking bolt 104 downwardly into engagement with the keeper 106 thereby automatically locking the middle portion of the auxiliary door. The front edge of the auxiliary door is then locked to the side sill and the side plate by swinging the actuating lever 126 upwardly so as to re-establish engagement between the lower sliding bolt 125 and its keeper 131 and between the upper sliding bolt 132 and its keeper 139. Thereupon the main door 67 is moved longitudinally upon the track 83 to closed position and is locked to the auxiliary door by means of the lock 151 which is adapted to receive a seal (not shown).

It will be apparent from Fig. 3 of the drawings that when the sliding bolts 125 and 132 are not properly projected into locking engagement with the keepers 131 and 139 the inner end of the lever will project inwardly beyond the flange 74 of the channel construction at the front edge of the auxiliary door. Therefore if the front edge of the auxiliary door is not properly locked and workmen attempt to secure a grain door to the nailing strip 161 carried by the auxiliary door and the nailing strip 162 carried by the door post 13, the projecting end 128 of the lever will prevent the securement of the grain door. The workmen are thereby warned that the front edge of the auxiliary door is not properly locked and can actuate the lever 126 to bring about proper locking. It will be evident that because of its construction and the flush relationship of the inner surfaces of the auxiliary

door and the side wall the auxiliary door serves as a grain door without the need for an additional grain door. While the flush relationship between the inner surfaces of the auxiliary door and the car side is preferred, it will be apparent that the auxiliary door will serve as a grain door even though its inner surface is not flush with the inner surface of the side wall.

The actuating lever 126 also serves as a warning that the front edge of the auxiliary door is not properly locked even where grain doors are not secured across the main door opening. As best shown in Fig. 3 of the drawings the lever 126 will extend either partly or entirely across the main door receiving channel portion 143 of the front stop 141 whenever the sliding bolts 125 and 132 are not in proper locking engagement with their respective keepers. In this event the lever 126 will lie in the path of closing movement of the main door and will prevent movement thereof to the full closed position. In order to fully close the main door the workmen must therefore push the lever 126 upwardly so that it clears the channel portion 143 of the front stop. In so doing proper locking engagement of the sliding bolts with their keepers is obtained. When the front edge of the auxiliary door is properly locked the lever 126 is inclined upwardly and its outer end lies closely adjacent to the inner face of the main door. By virtue of this relationship the main door prevents downward swinging movement of the lever and accidental unlocking of the front edge of the auxiliary door.

It will be apparent from the foregoing detailed description that a more nearly all-purpose car has been provided by the instant invention. Packaged goods, material shipped in cartons, and particularly grain and other bulk materials, can by reason of the instant invention be shipped in cars having wide door openings, with the same facility as in cars having normal door openings covered by single doors. It will also be apparent that cars embodying the instant invention can be utilized as single door cars where the wide door opening is not required. In this event only the main lift door need be utilized to expose the normal width of door opening. The auxiliary door in this case is securely locked to the side wall by means of the locks hereinabove described so that, in effect, the auxiliary door becomes an extension and a part of the side wall.

It will be apparent that numerous changes and modifications in the details of the invention will be clear to those skilled in the art. It will be apparent also that certain features of construction of the auxiliary door can be utilized in sliding flush doors which are used alone to cover door openings in freight cars. 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 railway box car having a floor and side walls provided with wide door openings each of which is adapted to be closed by an auxiliary sliding flush door and a main sliding door mounted for movement on the outside of a said wall, said car embodying side sills, each of said side sills comprising an angular member having an inwardly extending horizontal flange and an outer upstanding flange which extends across the door opening of said side wall, said upstanding flange being of full height beyond the door opening, a portion of said upstanding flange which extends across the door opening terminating below the upper plane of said floor, the other portion of said upstanding flange which extends across the door opening terminating substantially in the upper plane of said floor, said auxiliary door when closed lying above said side sill and flush with the inside and outside of said side wall, said main door when closed lying outwardly of said other portion of said upstanding flange of said side sill.

2. In a railway box car having a side wall provided with a wide door opening, an auxiliary sliding flush door having a thickness substantially equal to the thickness of said wall adapted to close a portion of the door opening, a main sliding door movable longitudinally on the outside of said wall for closing the other portion of the door opening, a track disposed parallel to said wall for supporting said doors, means mounting said auxiliary door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said auxiliary door and provided with upper and lower cranks, said wall having fixed flanges lying substantially in the inner and outer planes thereof and extending vertically along the door opening, said auxiliary door when closed lying flush with the inside and outside of said wall and the rear marginal portion thereof lying between said vertically extending flanges, a channel-shaped construction extending along the front edge of said auxiliary door and facing toward the door opening, a locking device disposed in said channel-shaped construction, and a door stop secured to and extending outwardly from said front edge of said auxiliary door, said door stop being engageable by said main door to limit closing movement thereof.

3. The combination as defined in claim 2 wherein said means is operatively connected to a vertically slidable locking bolt adapted to be automatically projected into locking engagement with a keeper secured to the side wall or retracted therefrom by the operation of said means.

4. The combination as defined in claim 2 wherein said locking device includes oppositely sliding locking bolts and a pivoted lever adapted to project said locking bolts into engagement with keepers secured to said side wall above and below the door opening, said lever projecting inwardly of said auxiliary door when said locking bolts are not properly engaged with said keepers.

5. The combination as defined in claim 2 wherein said locking device includes oppositely sliding locking bolts and a pivoted lever adapted to project said locking bolts into engagement with keepers secured to said side wall above and below the door opening, said lever projecting outwardly into the path of closing movement of said main door when said locking bolts are not properly engaged with said keepers.

6. The combination as defined in claim 2 wherein said locking device includes oppositely sliding locking bolts and a pivoted lever adapted to project said locking bolts into locking engagement with keepers secured to said side wall above and below the door opening, said lever being swung upwardly to project said locking bolts into engagement with said keepers, said main door when closed lying adjacent to and being adapted to engage the outer end of said lever to prevent downward movement thereof and disengagement of said locking bolts from said keepers.

7. In a railway box car having a side wall provided with a wide door opening, main and auxiliary doors for closing the door opening, a track for said doors secured to said car below the door opening, said track being parallel to said side wall, means mounting said auxiliary door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said auxiliary door and provided with upper and lower cranks, said auxiliary door when seated in the door opening being flush with the inside and outside of said side wall, flanges on said wall lying substantially in the inner and outer planes thereof and extending vertically along the door opening, the rear marginal portion of said auxiliary door lying between said flanges when said auxiliary door is seated in the door opening, and a locking device carried by said auxiliary door for fastening the front margin thereof to said side wall.

8. In a railway box car having a side wall provided with a wide door opening, main and auxiliary doors for closing the door opening, a track for said doors secured to said car below the door opening, said track being parallel to said side wall, and means mounting said auxiliary door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said auxiliary door and provided with upper and lower cranks, said auxiliary door when seated in the door opening being flush with the inside and outside of said side wall, the portion of said lower cranks adjacent to said pipes overlapping the lower margin of said auxiliary door, said lower margin being recessed adjacent to said pipes, the portion of said lower cranks remote from said pipes extending into said recesses when said auxiliary door has been moved laterally out of the door opening.

9. In a railway box car having a side wall provided with a wide door opening, main and auxiliary doors for closing the door opening, a track for said doors secured to said car below the door opening, said track being parallel to said side wall, means mounting said auxiliary door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said auxiliary door and provided with upper and lower cranks, said auxiliary door when seated in the door opening being flush with the inside and outside of said side wall, the portion of said lower cranks adjacent to said pipes overlapping the lower margin of said auxiliary door, said lower margin being recessed adjacent to said pipes, the portion of said lower cranks remote from said pipes extending into said recesses in engagement with one of the walls thereof when said auxiliary door has been moved laterally out of the door opening, and a stop for limiting longitudinal closing movement of said auxiliary door, said stop being secured to said car below the door opening and being engageable with said remote portion of one of said lower cranks.

10. A railway box car comprising side walls provided with wide door openings each of which is adapted to be closed by a sliding flush door having a thickness substantially equal to the thickness of said side walls and a main sliding door, each of said walls embodying a side plate extending substantially the length of said car and having an outwardly extending web and a downwardly extending outer flange, a header for said auxiliary door, said header having a flange secured to said downwardly extending flange of said side plate, and inwardly extending flange, a downwardly extending flange disposed substantially in the inner plane of said side wall and an outwardly extending flange spaced below said inwardly extending flange, one end of said header terminating in the door opening and a supporting member secured to said side plate and to said end of said header.

11. A railway box car comprising side walls provided with wide door openings each of which is adapted to be closed by a sliding flush door having a thickness substantially equal to the thickness of said side walls and a main sliding door, each of said walls embodying a side plate extending substantially the length of said car and having an outwardly extending web and a downwardly extending outer flange, a header for said auxiliary door, said header having a flange secured to said downwardly extending flange of said side plate, an inwardly extending flange, a downwardly extending flange disposed substantially in the inner plane of said side wall and an outwardly extending flange spaced below said inwardly extending flange, one end of said header terminating in the door opening and a supporting member secured to said side plate and to said end of said header, said auxiliary door having a flange on the upper portion thereof adapted to be received between said inwardly and outwardly extending flanges of said header when said auxiliary door is seated in the door opening.

12. A railway box car comprising side walls provided with wide door openings each of which is adapted to be closed by a sliding flush door having a thickness substantially equal to the thickness of said side walls and a main sliding door, each of said walls embodying a side plate extending substantially the length of said car and having an outwardly extending web and a downwardly extending outer flange, a header for said auxiliary door, said header having a flange secured to said downwardly exending flange of said side plate, an inwardly extending flange, a downwardly extending flange disposed substantially in the inner plane of said side wall and an outwardly extending flange spaced below said inwardly extending flange, one end of said header terminating in the door opening and a supporting member secured to said side plate and to said end of said header, the forward edge of said auxiliary door carrying a locking device including a vertically sliding bolt, said header being provided with an opening for said locking bolt and a keeper secured to said header above the opening provided therein, said keeper being adapted to receive said locking bolt.

13. In a railway box car having a side wall provided with a wide door opening, an auxiliary sliding flush door having a thickness substantially equal to the thickness of said wall adapted to close a portion of the door opening, a main sliding door movable longitudinally on the outside of said wall for closing the other portion of the door opening, a track disposed parallel to said wall for supporting said door, means mounting said auxiliary door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said auxiliary door and provided with upper and lower cranks, said wall having fixed flanges lying substantially in the inner and outer planes thereof and extending vertically along the door opening, said auxiliary door when closed lying flush with the inside and outside of said wall and the rear marginal portion thereof lying between said vertically extending flanges, a locking device secured to the front vertical margin of said auxiliary door, and a door stop secured to and extending outwardly from said front edge of said auxiliary door, said door stop being engageable by said main door to limit closing movement thereof.

14. The combination as defined in claim 13 wherein said means is operatively connected to a vertically slidable locking bolt adapted to be automatically projected into locking engagement with the keeper secured to the side wall or retracted therefrom by the operation of said means.

15. In a railway box car having a side wall provided with a door opening, a sliding flush door adapted to be seated in the door opening, a track secured to said car below the door opening, said track being parallel to said side wall, means mounting said door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said door and provided with upper and lower cranks, said door when seated in the door opening being flush with the inside and outside of said wall, flanges on said wall lying substantially in the inner and outer planes thereof and extending vertically along the door opening, and cooperating means on said door and said car automatically shifting said door rearwardly to dispose the rear margin thereof between said flanges during the lateral movement of said door into the door opening.

16. The combination as defined in claim 15 wherein said cooperating means includes one of said lower cranks.

17. In a railway box car having a side wall provided with a door opening, a sliding flush door adapted to be seated in the door opening, a track secured to said car below the door opening, said track being parallel to said

side wall, means mounting said door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said door and provided with upper and lower cranks, said door when seated in the door opening being flush with the inside and outside of said wall, flanges on said wall lying substantially in the inner and outer planes thereof and extending vertically along the door opening, a stop secured to said car below the door opening, said stop engaging one of said lower cranks to limit longitudinal closing movement of said door, said one lower crank and said stop cooperating to shift said door rearwardly to dispose the rear margin thereof between said flanges during the lateral movement of said door into the door opening.

18. In a railway box car having a side wall provided with a door opening, a sliding flush door adapted to be seated in the door opening, a track secured to said car below the door opening, said track being parallel to said side wall, means mounting said door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said door and provided with upper and lower cranks, said door when seated in the door opening being flush with the inside and outside of said wall, flanges on said wall lying substantially in the inner and outer planes thereof and extending vertically along the door opening, the portion of said lower cranks adjacent to said pipes overlapping the lower margin of said door, said margin being recessed adjacent to said pipes, the portion of the lower cranks remote from said pipes extending into said recesses in engagement with one of the walls thereof when said door has been moved laterally out of the door opening, a stop secured to said car below the door opening, said stop being engageable with said remote portion of one of said lower cranks to limit longitudinal closing movement of said door, said stop and said one lower crank cooperating to shift said door rearwardly to dispose the rear margin thereof between said flanges during the lateral movement of said door into the door opening.

19. In a railway box car having a side wall provided with a door opening, a sliding flush door adapted to be seated in the door opening, a track secured to said car below the door opening, means mounting said door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said door and provided with upper and lower cranks, said door when seated in the door opening being flush with the inside and outside of said wall, the portion of said lower cranks adjacent to said pipes overlapping the lower margin of said door, said margin being recessed adjacent to said pipes, the portion of said lower cranks remote from said pipes extending into said recesses when said door has been moved laterally out of the door opening.

20. In a railway box car having a side wall provided with a wide door opening, main and auxiliary doors for closing the door opening, a track for said doors secured to said car below the door opening, said track being parallel to said side wall, means mounting said auxiliary door upon said track for longitudinal movement and for lateral movement into and out of the door opening, said means embodying vertical pipes rotatably mounted on said auxiliary door and provided with upper and lower cranks, said auxiliary door when seated in the door opening being flush with the inside and outside of said side wall, means mounting said main door for longitudinal movement on said track, means for securing the rear vertical marginal portion of said auxiliary door to said side wall when said auxiliary door is seated in the door opening, a locking device carried by said auxiliary door for securing the front vertical margin thereof to said side wall when said auxiliary door is seated in the door opening, and a member for said main door secured to and along the front vertical marginal portion of said auxiliary door and extending laterally therefrom, said member engaging the front vertical margin of said main door when said doors are closed.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,834,067 May 13, 1958

Wilfred A. Beauchamp

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 11, line 50, for "and inwardly" read -- an inwardly --;

column 12, lines 11 and 12, for "exending" read -- extending --.

Signed and sealed this 8th day of July 1958.

(SEAL)
Attest:
KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents