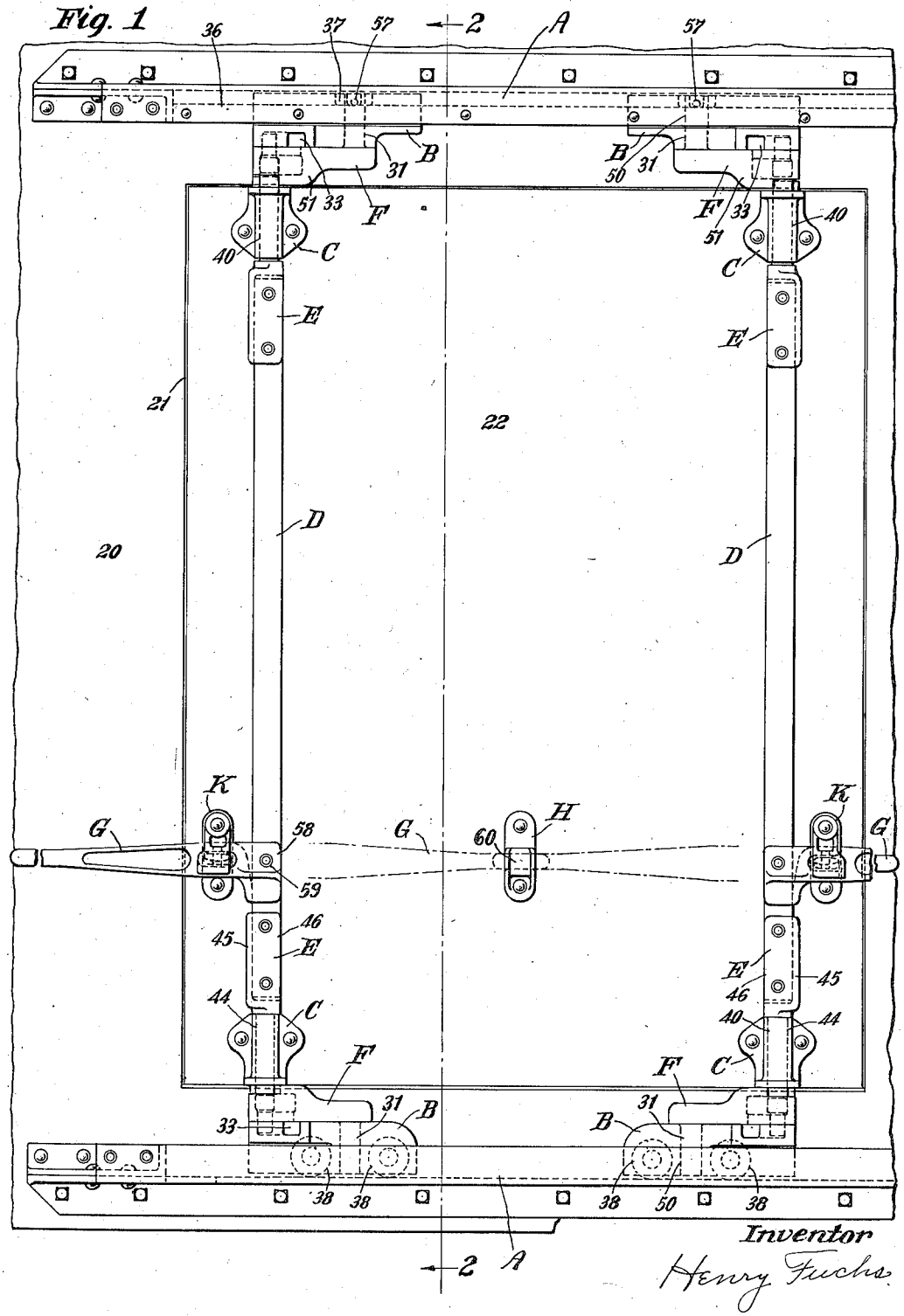
Oct. 27, 1936. H. FUCHS 2,058,860

REFRIGERATOR CAR DOOR

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Fig. 1



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Fig. 2

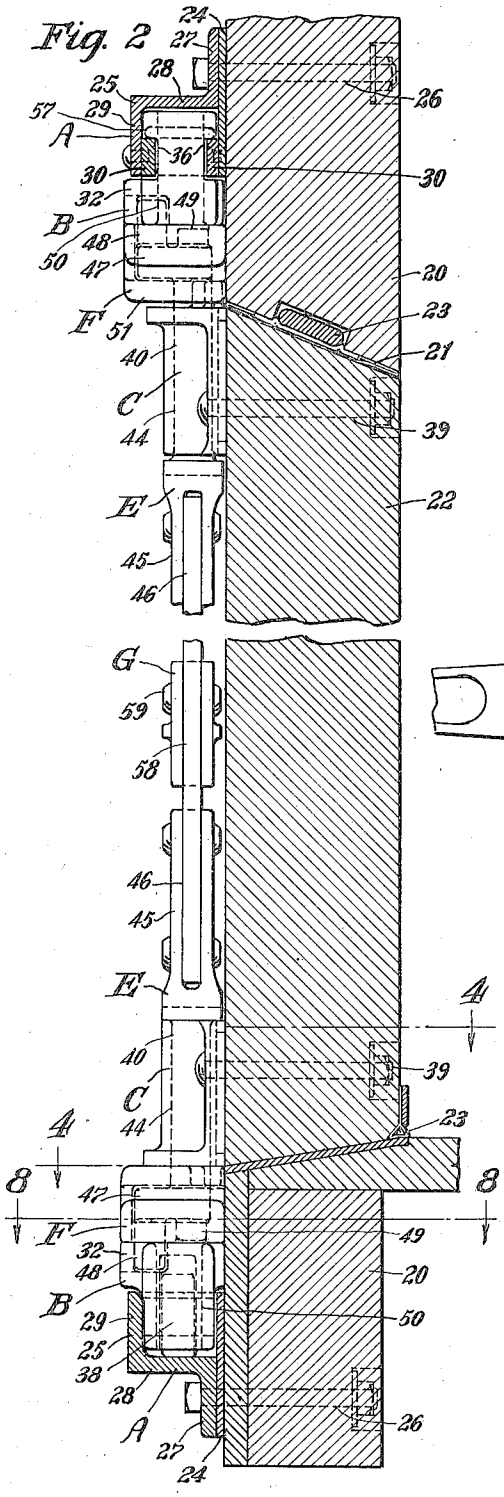
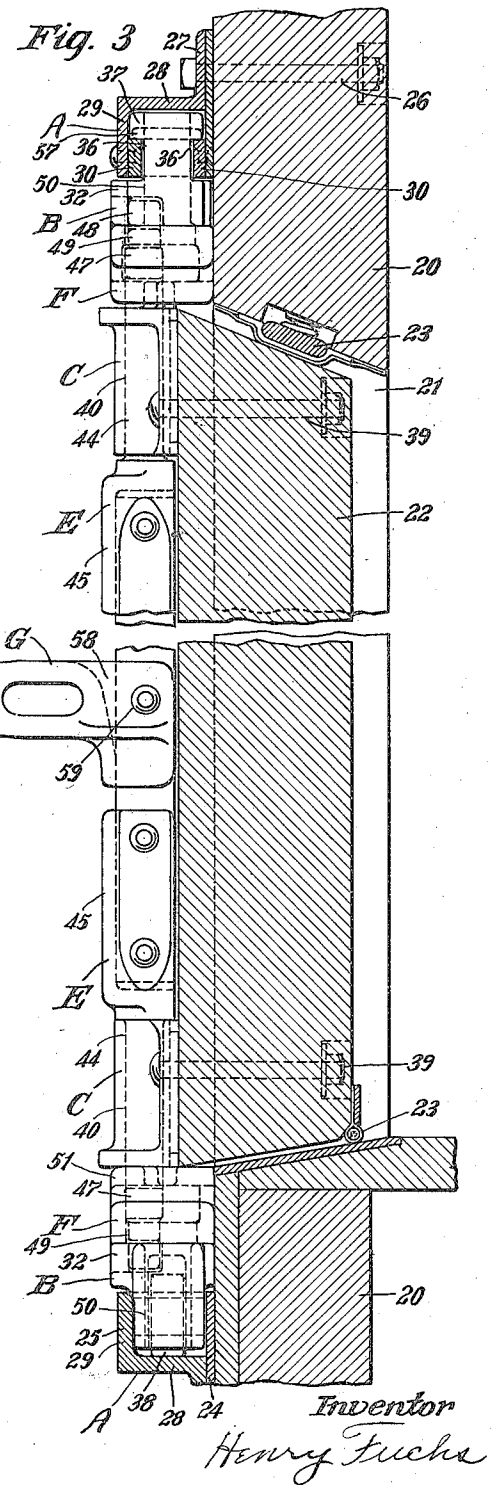


Fig. 3



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Fig. 4

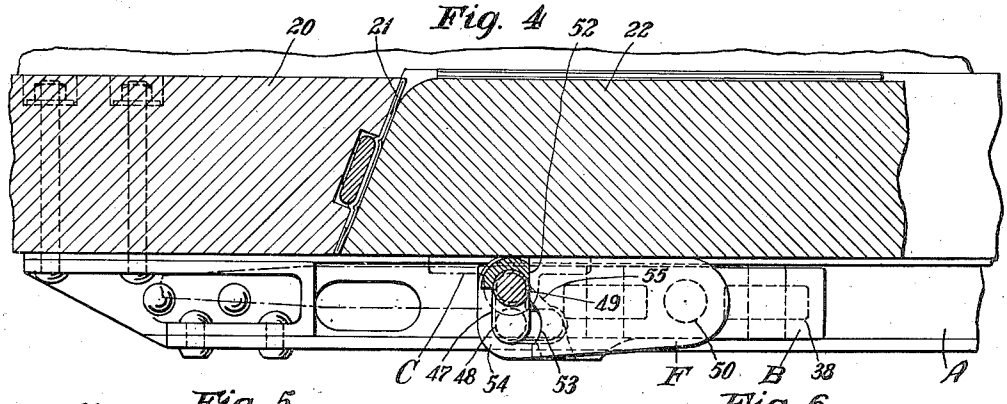


Fig. 5

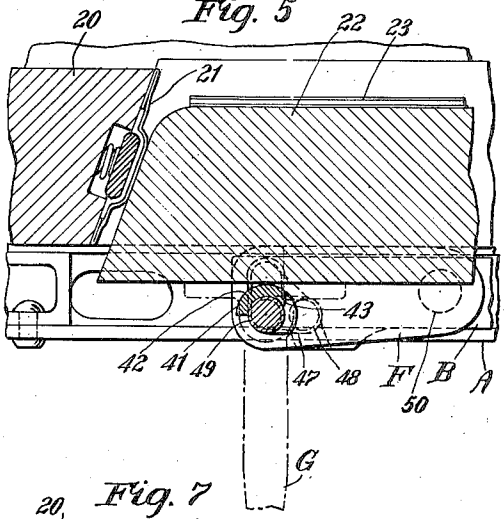


Fig. 6

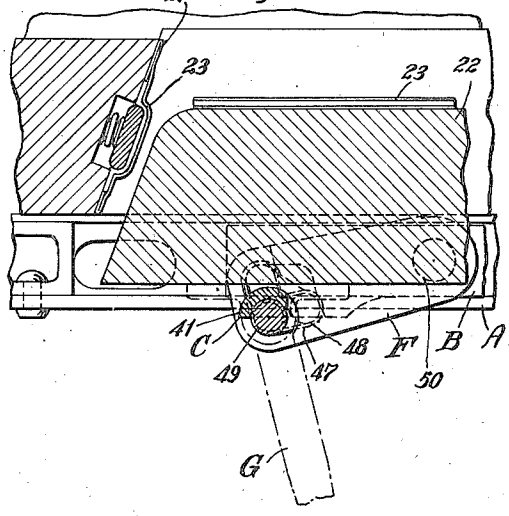


Fig. 7

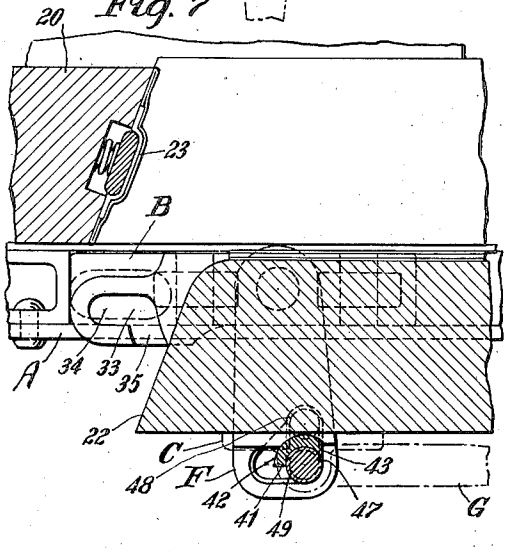
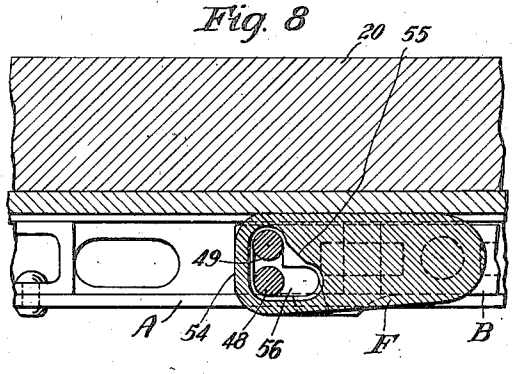


Fig. 8



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Fig. 9

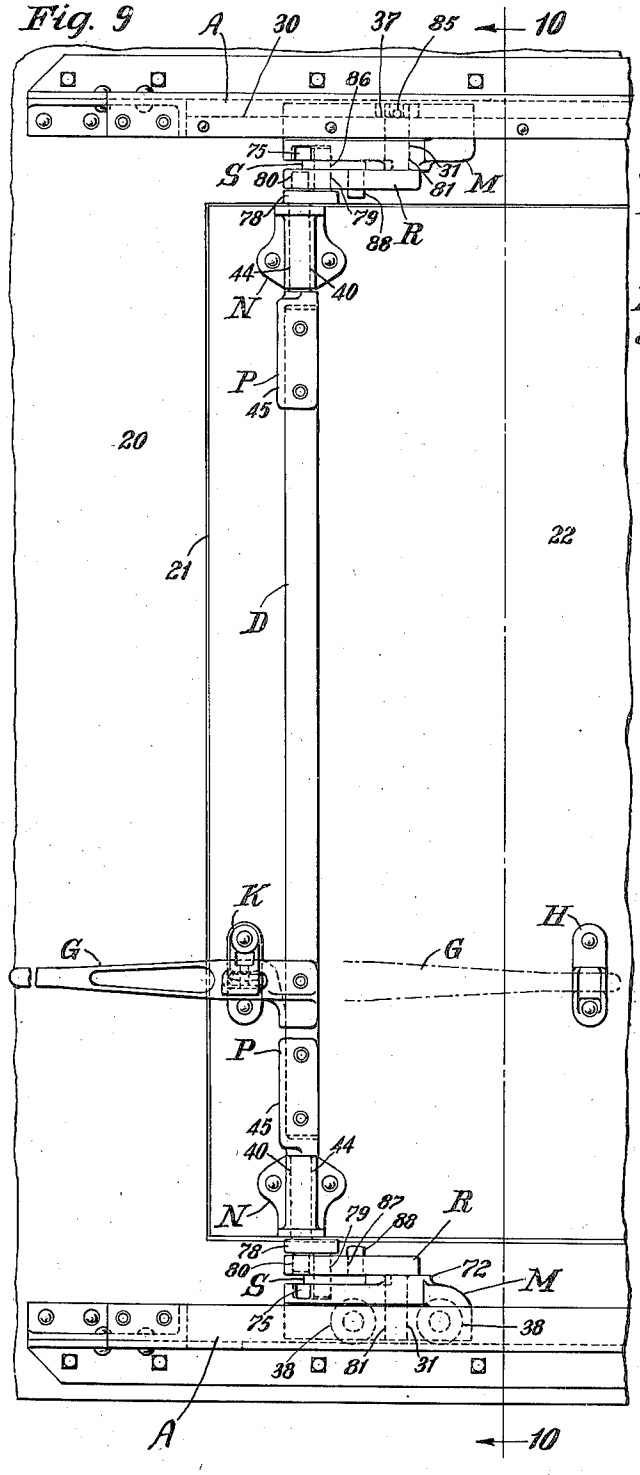
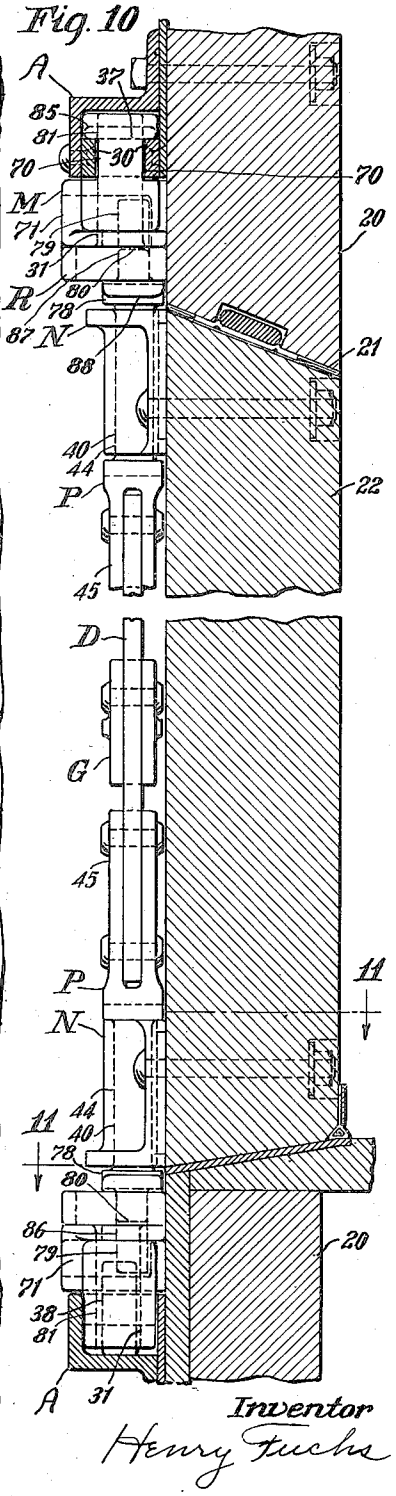


Fig. 10



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Fig. 11

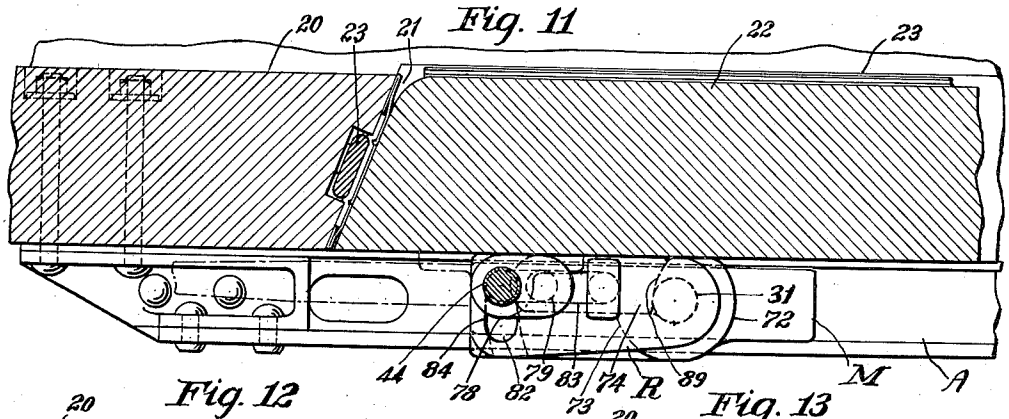


Fig. 12

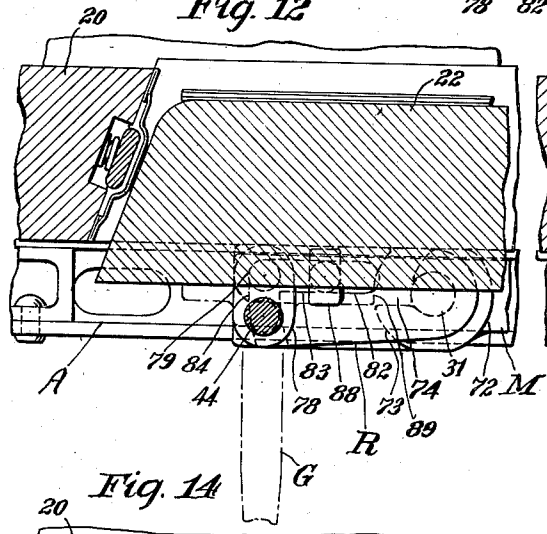


Fig. 13

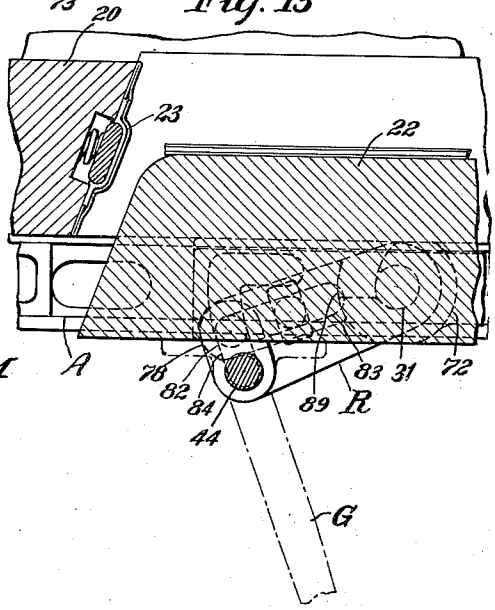
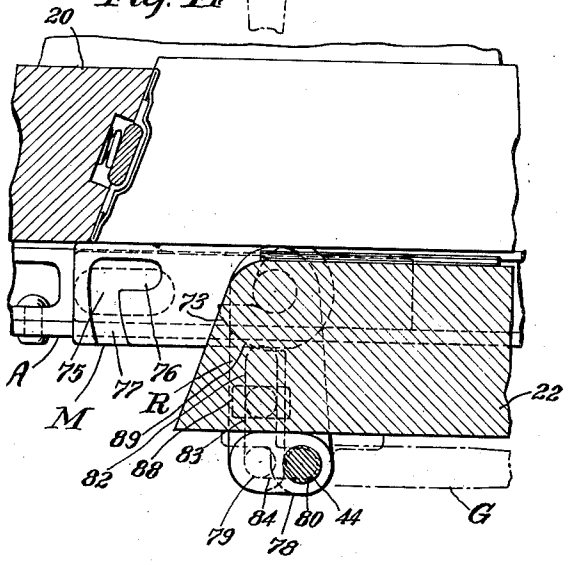


Fig. 14



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Patented Oct. 27, 1936

2,058,860

UNITED STATES PATENT OFFICE

2,058,860

REFRIGERATOR CAR DOOR

Henry Fuchs, Chicago, Ill., assignor to W. H. Miner, Inc., Chicago, Ill., a corporation of Delaware

Application August 16, 1934, Serial No. 740,052

20 Claims. (Cl. 20—23)

This invention relates to improvements in refrigerator car doors.

One object of the invention is to provide a door construction for refrigerator cars comprising a sliding door member for closing the door opening of the car and means for supporting the door for movement toward and away from the side of the car, wherein simple and efficient manually actuated means is employed for moving the door into and withdrawing the same from the door opening, the actuating means being so designed that great force is exerted during the final closing and initial opening movements of the door without subjecting the supporting means to excessive strains.

A further object of the invention is to provide means of the character described in the preceding paragraph, which is so mounted and arranged that the projection of the parts thereof will not exceed certain predescribed limits so that the mechanism will clear the usual loading platform structures and all other obstructions encountered in standard railway practice.

Another object of the invention is to provide in a sliding door construction for refrigerator cars, simple and efficient actuating means engageable with rugged and substantial keepers for either forcing the door tightly closed after it has been moved to partly closed position, or prying the same partly open, the actuating means being designed to operatively connect with movable supporting means for the door, to actuate the supporting means to either move the door into the door opening to said partly closed position or to completely withdraw the door from the door opening after it has been partly opened.

A more specific object of the invention is to provide a door construction for refrigerator cars comprising a door member mounted on swinging arms pivotally supported on carriers slidable lengthwise of the car, and manually actuated operating means for closing and opening the door, the operating means being designed to engage the swinging arms to either move the door into the door opening to partially close the same or to withdraw the door from the door opening after partial opening of the door, the operating means being further designed to engage with keeper means to either force the door from its partially closed to tightly closed position or pry the door partially open.

A further object of the invention is to provide in a mechanism of the character described in the preceding paragraph an operating member in the form of a rotary shaft which has means thereon for operatively connecting the same to the swinging supporting arms and is also provided with keeper engaging crank members adapted to engage within cam slots provided in the slidable carriers to effect final forcible closing and initial forcible opening of the door.

A still further object of the invention is to provide a door construction for refrigerator cars, comprising a door member movably supported on swinging arms pivoted on carriers slidably mounted on tracks extending lengthwise of the car, a rotary operating shaft on the door having crank arms at opposite ends, the pins of which extend through L-shaped slots in the swinging arms and engage within keeper slots in the carriers to force the door either tightly closed or pry the same partially open, wherein the operating shaft is further provided with cylindrical extensions concentric with the axis of the rotary shaft and engaged within the L-shaped slots of the arms to lock the shaft to the arms during a predetermined rotation of the shaft to swing the arms to withdraw the door from the door opening after the door has been pried partially open.

Yet another object of the invention is to provide in a mechanism of the character described in the preceding paragraph, means for holding the shaft locked to the arms during a predetermined partial rotation of the shaft to bring said door to partially closed position.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings forming a part of this specification, Figure 1 is an elevational view, partly broken away, of the side wall of a refrigerator car, illustrating my improvements in connection therewith, said view showing the door closed. Figure 2 is a vertical sectional view, partly broken away, on an enlarged scale, corresponding substantially to the line 2—2 of Figure 1. Figure 3 is a view similar to Figure 2, showing the door partially open. Figure 4 is a horizontal sectional view, corresponding substantially to the line 4—4 of Figure 2, said view illustrating the mechanism at one side of the door. Figures 5, 6, and 7 are views similar to Figure 4, partially broken away, showing the door in several different positions. Figure 8 is a horizontal sectional view, partly broken away, corresponding substantially to the line 8—8 of Figure 2. Figure 9 is a view similar to Figure 1, illustrating another embodiment of the invention, said view being broken away, substantially at the vertical center line of the door. Figure 10 is a vertical sectional view, on an en-

larged scale, partly broken away, corresponding substantially to the line 10—10 of Figure 9. Figure 11 is a broken, horizontal sectional view, corresponding substantially to the line 11—11 of Figure 10. Figures 12, 13, and 14 are horizontal sectional views similar to Figure 11, partly broken away, said views showing the door in several different positions.

In said drawings, 20 indicates the side wall of the car, which side wall is provided with the usual door opening 21 closed by a single door 22. The door 22 is slidable lengthwise of the car and is displaceable laterally to either move the door into, or withdraw it from, the door opening 21. As shown, the cooperating engaging edge faces of the door and walls of the door openings are beveled, and the usual insulating packing material indicated by 23 is employed to seal the joint between the door and walls of the door opening.

Referring first to the embodiment of the invention illustrated in Figures 1 to 8 inclusive, my improvements comprise broadly top and bottom tracks A—A; carriers B—B and B—B cooperating with the top and bottom tracks A—A; pairs of top and bottom combined supporting and journal brackets C—C and C—C; a pair of vertically disposed operating shafts D—D; keeper engaging end members E—E and E—E on the shafts D—D; sets of top and bottom pivoted supporting arms F—F and F—F for the door; two operating handle levers G; a latch bracket H; and two locking members K—K.

The tracks A—A are of similar design, but reversely arranged, the top track facing downwardly and the bottom track facing upwardly. As will be understood, the tracks A—A are of such a length that the door 22 may be slid entirely clear of the door opening 21. Each track A is formed by a longitudinally extending flat bar 24 and a bar 25 of substantially Z-shaped cross-section, as shown most clearly in Figures 2 and 3. The bar 25 is secured to the bar 24 by means of bolts 26—26 or any other similar securing means, extending through the wall 20 of the car, the bar 24, and the flange 27 of the bar 25. As most clearly shown in Figures 2 and 3, the Z-bar 25 is so arranged that the horizontal web 28 thereof forms the inner wall of the guideway of the track A. The flange 29, which extends in opposite direction to the flange 27 of the Z-bar 25, is spaced from the front face of the bar 24, thereby providing a guide slot between the bar 24 and the flange 29. The bottom wall of the guideway of the bottom track A serves as supporting means for the bottom carriers B—B. The depending portion of the bar 24 and the flange 29 of the upper guide track A are provided with supporting guide strips 30—30, which are secured to the inner surfaces of the opposite side walls of the guideway of said track. The guide strips 30—30 serve to support the upper carriers B—B, as hereinafter described.

The carriers B—B and B—B, which cooperate with the top and bottom tracks, are of similar design, with the exception that the carriers B—B which cooperate with the upper track are slotted to engage with the guide strips 30—30, and the carriers B—B which cooperate with the lower track A are provided with rollers for supporting said carriers. Each carrier B is in the form of a blocklike casting guided between the walls of the corresponding track. Each carrier B has a vertically disposed journal opening 31 adjacent to one end thereof, said opening being for a purpose hereinafter described. Each carrier B has a laterally outwardly enlarged portion 32 outwardly of the guide tracks overhanging the flange 29 of the track as clearly shown in Figure 2. The enlarged portion 32 is provided with an upwardly facing, substantially L-shaped slot 33 comprising a section 34 parallel to the longitudinal axis of the carrier and a slightly curved section 35 extending laterally from the section 34 and opening through the outer side of the carrier. The upper carriers B—B have their outer sides longitudinally slotted as indicated at 36—36 to fit the guide strips 30—30 of the upper track. These carriers are thus supported for sliding movement in the upper track. Each of the upper carriers is further provided with a seat 37 for a purpose hereinafter described. The carriers B—B, which cooperate with the bottom track, are supported by anti-friction rollers 38—38 which are contained in suitable pockets provided in said carriers.

The journal brackets C—C and C—C are secured to the outer side of the door 22 and serve to support the two operating shafts D—D. Each journal bracket comprises two sections, a back plate which engages the door and a front plate which engages over the back plate and is secured in position by bolts or other suitable securing elements 39—39 extending through the brackets C—C and the door 22. The two sections of each bracket are provided with registering partial bearing seats, which together provide a vertically disposed, cylindrical bearing opening 40. The back plate of each journal bracket C is provided with a projecting locking flange 41 having a curved outer face 42 and a substantially flat abutment face 43, as clearly shown in Figures 4 to 7 inclusive. The curved face 42 is concentric with the vertical axis of the bearing opening of the corresponding bracket C.

The operating shafts D—D which are vertically disposed and arranged in opposite ends of the door, are preferably of substantially rectangular cross-section, as shown in the drawings.

The end members E—E and E—E are arranged in pairs at opposite ends of the operating shafts D—D. Each end member E has a cylindrical shaftlike bearing section 44, which is engaged within the bearing opening 40 of the corresponding journal bracket C. At the inner end, each member E is provided with a socket member 45, which has a laterally opening socket 46 of substantially rectangular cross-section therein receiving the corresponding end of the cooperating shaft D. As shown, each end member E is secured to the shaft D by means of rivets or other suitable securing means extending through the shaft and the side walls of the socket. At the outer end, each end member E is provided with a crank arm 47 having a crank pin 48 at the outer end thereof. Each crank arm is also provided with a cylindrical extension 49, which is coaxial with the cylindrical bearing portion 44 of the end member E. As most clearly shown in Figures 2 and 3, the cylindrical extension 49 is considerably shorter than the crank pin 48.

The pivoted supporting arms F—F and F—F are arranged above and below the door, as clearly shown in Figures 1, 2, and 3. Each arm F is in the form of a supporting hinge link having a trunnion 50 at one end thereof, which is journaled in the opening 31 of the corresponding carrier B. The arm F is enlarged at the end opposite to the trunnion, said enlarged portion being indicated by 51. As will be evident upon reference to Figure 1, the arms which are arranged in

pairs at opposite ends of each operating shaft D are reversely arranged so as to properly cooperate with the top and bottom carriers B—B. It is further pointed out that the sets of arms F—F and F—F at the top and bottom of the door are so arranged that the arms of each set extend in reverse directions. Inasmuch as all of the arms are of the same design, the description of one of the bottom arms F will suffice for the clear disclosure of this portion of the mechanism. Each bottom arm F has the upper section of the enlarged portion 51 thereof cut away, as shown in Figure 4, to present a straight flat guide face 52 at the inner side and a curved locking seat 53 outwardly of the straight face. The straight face 52 and the curved seat 53 of the arm F cooperate respectively with the straight abutment face 43 and the curved surface 42 of the locking flange 41 of the corresponding bearing bracket C, as hereinafter more fully pointed out. Each bottom arm F has a section 54 below the straight face 52 and locking seat 53, which extends beyond said upper section, as clearly shown in Figures 4 to 8 inclusive. The enlarged portion 51 of each arm F is recessed between the upper and lower sections, as indicated at 55, to accommodate the crank arm 47 of the corresponding end member E. The lower section 54 is provided with an L-shaped slot 56 extending therethrough, said slot being most clearly shown in Figure 8. As will be clear upon reference to Figures 1 to 7 inclusive, the locking flange 41 of each bracket C overlaps the corresponding arm F so that it engages with the straight face 52 when the door is in closed position and interlocks with the curved seat 53 after a predetermined rotation of the operating shaft D. The crank pin 48 of each end member E extends entirely through the L-shaped slot 56 of the corresponding arm F and is adapted to project into the slot 33 of the corresponding carrier during the initial opening movement and final closing movement of the door. The cylindrical bearing portion or projection 49 of each end member E engages within the L-shaped slot 56 of the arm F so as to guide the pin of the operating crank member in its movement.

The top supporting arms F—F are identical with the lower arms but reversely arranged, that is the trunnions 50—50 thereof project upwardly. The trunnions 50—50 of these arms are of such a length that they extend into the seats 37—37 of the top carriers B—B, as shown in Figures 1, 2, and 3. At the upper end, each of these trunnions has a pin 57 extending transversely therethrough, said pin being accommodated in the seat 37 of the corresponding carrier B, thereby supporting the arm F against downward displacement.

The operating handle lever G, by which the shaft D is rotated, is forked at its inner end, as indicated at 58, said forked portion embracing the shaft D on opposite sides and being connected to the shaft by a pivot pin 59. As most clearly shown in Figure 1, the lever G is cut away between the forked section thereof so that the lever may be swung upwardly to a limited extent to facilitate engagement thereof with the latch bracket H.

The latch bracket H, which is secured to the outer side of the door, serves as a holding means for the outer ends of the levers G—G when the door has been withdrawn from the door opening, so that the same will be held in proper position while being slid along the tracks A—A. The bracket H has a pocket 60 which receives the handles of the levers G—G.

The latch members K—K are of the type usually employed in connection with operating lever handles of refrigerator car doors and are used to lock the handles in fixed position when the door is closed. Each latch K is also provided with the usual car sealing means.

The operation of my improved mechanism is as follows: In opening the door 22, the operating levers G—G may be actuated simultaneously or successively. Inasmuch as the operating mechanism comprising the shaft D, end members E—E, and supporting hinge link arms F—F at each end of the door is the same, the operation of only one of these mechanisms will be described in connection with the opening and closing of the door 22. To actuate the shaft D, the operating handle lever G is first unlocked from the corresponding latch member K. The attendant then pulls the lever G outwardly away from the side wall of the car, thereby rotating the shaft D and actuating the keeper engaging end members E—E at opposite ends of said shaft. During the first quarter rotation of the shaft D, the crank pin 48, which is engaged within the keeper slot 33 of the corresponding carrier B, will be swung about the axis of the shaft D, thereby forcing the door outwardly from the position shown in Figure 4 to that shown in Figure 5. During this action, the extension 49 and the crank pin 48 of the end member E will travel in the L-shaped slot 56 of the arm F. The crank pin 48 will thus travel to the right in the outer branch of the L-shaped slot, as clearly shown in Figures 4 and 5, while the cylindrical extension 49 will travel outwardly in that portion of the L-shaped slot 56 which is transverse to the supporting arm F. Inasmuch as the door is moved outwardly from the position shown in Figure 4 to that shown in Figure 5, the straight abutment face 43 of the flange 41 of the corresponding bracket C will slide outwardly on the flat face 52 of the arm F to the position shown in Figure 5. As will be evident upon reference to Figure 5, the parts are so proportioned that, upon further rotation of the shaft D, the curved surface 42 of the locking flange 41 will engage within the seat 53 of the arm F. Inasmuch as the crank pin is held against lateral movement in the outer portion of the L-shaped slot 56 of the arm F as shown in Figure 5, further rotation of the shaft in a contra-clockwise direction, as viewed in Figure 5, will cause the cylindrical portion 49 of the end member E to engage the outer wall of the slot, thereby locking the operating shaft D to the arm F and causing the latter to swing on its trunnion 50. During the time that the door is moved from the position shown in Figure 5 to that shown in Figure 6, the arm F is swung outwardly a sufficient distance to assure locking engagement of the flange 41 of the bracket C with the seat 53 of the arm F. As will be evident, due to the locking engagement of the flange 41 with the arm F, the shaft and end members E—E will be locked against lateral displacement with respect to the arms F—F. It is further pointed out that during the movement of the parts from the position shown in Figure 5 to that shown in Figure 6, the crank pin 48 is guided in the curved section 35 of the keeper slot 33 of the corresponding carrier B so that the crank pin 48 will not be disengaged from the keeper slot before the flange 41 of the bracket C is interlocked with the seat 53 of the corre-

sponding supporting hinge arm F. During movement of the operating handle G from the position shown in Figure 6 to that shown in Figure 7, the door will be swung completely open. After the door has been thus completely opened, the handle end of the operating lever G is engaged within the pocket 60 of the latch bracket H. With the parts thus locked, the door may be slid to the right as viewed in Figures 1 to 7 until it entirely clears the door opening.

In closing the door, the operation is substantially the reverse to that hereinbefore described. The attendant first slides the door into position in front of the door opening. The operating levers G are then disengaged from the bracket H, each lever being rotated from the dotted line position shown in Figure 1 to the full line position shown therein, thereby completely closing the door. Inasmuch as the locking flange 41 of each bracket C is engaged within the seat 53 of the corresponding supporting hinge arm F, rotation of the operating shaft D during the first quarter turn will cause the supporting hinge link arms F—F to rotate with the operating shaft. During the movement of the operating lever G from the position shown in Figure 7 to that shown in Figure 6, the arms F—F will be swung inwardly toward the side wall of the car a sufficient distance to enter the crank pins 48—48 of the crank arms of the shaft D into the sections 35—35 of the keeper slots 33—33 of the top and bottom carriers B—B. Further rotation of the shaft D by means of the operating handle lever G from the position shown in Figure 6 to that shown in Figure 5 will move the crank arms 48—48 completely into the sections of the keeper slots 33—33 which are parallel to the longitudinal axes of the carriers B—B. Inasmuch as the locking flanges 41—41 of the brackets C—C have been disengaged from the seats 53—53 of the arms F—F, the crank pins 48—48 and the cylindrical extensions 49—49 of the end members E—E will be free to travel in the L-shaped slots 56—56 of the arms F—F. Further rotation of the operating shaft D from the position shown in Figure 5 to that shown in Figure 4 will cause the door to be cammed inwardly by means of the crank pins 48—48 traveling in the keeper slots 33—33. As will be evident, the door is thus tightly forced into the door opening and held in that position because the axis of the operating shaft D is brought into position directly in back of the centers of the crank pins 48—48 of the end members E—E. When the door has been thus closed, the operating handle levers G—G are locked and sealed by means of the latch members K—K.

Referring next to the embodiment of the invention illustrated in Figures 9 to 14 inclusive, my improvements comprise broadly top and bottom tracks identical with the tracks A—A hereinbefore described, and also indicated by A—A; carriers M—M and M—M cooperating with the top and bottom tracks; pairs of top and bottom combined supporting journal brackets N—N and N—N; a pair of vertically disposed operating shafts identical with the shafts D—D hereinbefore described, and also indicated by D—D; keeper engaging end members P—P and P—P on the shafts D—D; sets of top and bottom pivoted supporting arms R—R and R—R for the door; a sliding latch plate S; and an operating lever, a latch bracket and two locking members identical with the operating hand lever G, latch bracket H, and the two locking brackets K—K hereinbefore described in connection with Figures 1 to 8 inclusive, and also indicated, respectively, by the characters G, H, and K—K in Figures 9 to 14 inclusive.

The various elements of the tracks A—A, shafts D—D, lever G, latch bracket H, and locking members K—K, shown in Figures 9 to 14 inclusive, are identical with the corresponding elements in Figures 1 to 8 inclusive, and are indicated by the same reference characters.

The top and bottom carriers M—M and M—M are in the form of blocklike castings guided within the ways of the tracks A—A. The carriers M—M and M—M, which cooperate with the top and bottom tracks A—A, are of similar design with the exception that the carriers which cooperate with the upper track are slotted, as indicated at 70—70, to cooperate with guide strips 30—30 of the track and have seats 37—37, corresponding to the seats 37—37 hereinbefore described in connection with the upper carriers B—B, and serving the same purpose, and the carriers M—M, which cooperate with the lower track A, are provided with anti-friction supporting rollers 38—38, similar to the rollers 30—30 of the lower carriers B—B hereinbefore described. The top and bottom carriers M—M are identical with the exception that the top carrier is inverted with respect to the bottom carrier. Each bottom carrier M projects above the track A and is laterally outwardly enlarged, as indicated at 71. The carrier M also has an upstanding boss 72 thereon, which has a curved outer abutment or guide surface 73 which cooperates with the sliding latch plate S in a manner hereinafter described. The inner section of the boss is provided with a pocket or recess 74, as most clearly shown in Figure 12, which accommodates the outer end of the sliding latch plate S when the parts are in the position shown in Figure 11. The carrier M is also provided with a vertically disposed bearing opening extending centrally through the boss and corresponding to the bearing opening 31 of the carrier B hereinbefore described, said bearing opening being also indicated by 31. At the left hand end, as shown in Figures 9, and 11 to 14 inclusive, each carrier M is provided with an L-shaped, upwardly facing keeper slot 75. The L-shaped keeper slot 75 has a section 76 disposed substantially parallel to the longitudinal axis of the carrier M and a communicating section 77 extending outwardly therefrom and opening through the outer wall of the carrier, as most clearly shown in Figure 14. The section 77 of the slot is preferably curved so as to properly accommodate the crank pin of the operating shaft during swinging movement of the supporting arm R.

The journal brackets N—N and N—N comprise front and rear sections provided with registering partial bearing seats which together form vertically disposed bearing openings corresponding to the openings 40—40 of the bearing brackets C—C, and also indicated by 40—40. The bearing brackets N—N are arranged in pairs at opposite ends of the door, each pair cooperating with the top and bottom ends of the corresponding operating shaft D.

The keeper engaging end members P—P and P—P are secured to opposite ends of the shafts D—D. Each end member P has a cylindrical shaft portion having a socket section at the inner end corresponding to the shaft portion 44 and the socket section 45 of the end member E, here-

inbefore described, and also designated, respectively, by the reference characters 44 and 45. The sockets of each set of end members P—P receive the opposite ends of the corresponding shaft D and the shaft sections 44—44 are journaled in the bearing brackets N—N. Each end member P has a crank arm 78 provided with a crank pin 79 at its outer end. Each end member is also provided with a cylindrical extension 80 coaxial with the shaft section 44. The cylindrical extension 80, as most clearly shown in Figures 9 and 10, is shorter than the crank pin 79.

The pivoted supporting arms R—R and R—R, which are in the form of hinge members, are arranged in pairs above and below the door 22 and serve to support the door on the sliding carriers M—M and M—M. Each supporting arm R has a vertically disposed trunnion 81 at one end thereof, journaled in the opening 31 of the corresponding carrier M. Each arm, further, has an L-shaped guide slot 82 at the end opposite to the trunnion 81. As most clearly shown in Figures 11 to 14 inclusive, the L-shaped slot 82 has a section 83 extending parallel to the longitudinal axis of the corresponding arm R, and a section 84 at right angles to the section 83 and communicating therewith. As will be clear upon reference to the drawing, the slot section 83 is considerably longer than the section 84. The crank pin 79 of the member P extends through the slot 82 and is adapted to engage within the keeper slot 75 of the corresponding carrier M in the final closing and initial opening movements of the door.

The cylindrical extension 80 of each end member P engages only within the L-shaped slot 82 of the arm R. Each upper arm R is supported by a collar 85 fixed to the end of the trunnion 81 and held in the seat 37 of the corresponding carrier M.

The sliding latch plate S is in the form of a bar and is disposed between the supporting arm R and the corresponding carrier M. Each plate S has an opening 86 therethrough which accommodates the corresponding crank pin 79. At the end opposite to that having the opening 86, the plate S is provided with an upstanding trunnion or guide pin 87, which engages within the elongated section 83 of the L-shaped guide slot 82 of the corresponding supporting arm R. The pin 87 is preferably headed at the outer end, as indicated at 88, to maintain the pin in the proper position within the guideway. Each slide S has a curved outer end edge 89 adapted to register and engage the curved surface 73 of the boss 72 of the corresponding carrier M. In the normal position of the parts, the end of the slide S, which is adapted to engage with the curved surface of the boss 72, is seated in the pocket 74 at the inner side of the boss.

The operation of the improved construction illustrated in Figures 9 to 14 inclusive is as follows: In opening the door, the attendant first unlocks the operating lever arm G from the locking member K and then swings the lever arm outwardly away from the side of the car. During this swinging movement, the corresponding operating shaft D will be rotated to actuate the crank arms at opposite ends of said shaft. During the first quarter turn of the shaft D from the position shown in Figure 11 to that shown in Figure 12, the extensions 80—80 on the end members P—P will travel outwardly in the branches 84—84 of the guide slots 82—82 of the supporting arms R—R. During this time, the crank pins 79—79 will travel to the left in the branches 83—83 of the slots 82—82, as clearly seen in Figures 11 and 12. When the parts reach the position shown in Figure 12, the latch plates S—S will be entirely withdrawn from the pockets 74—74 of the bosses 72—72 of the carriers M—M. During rotation of the shaft D from the position shown in Figure 11 to that shown in Figure 12, the crank pins 79—79 will also travel to the left in the keeper slots 75—75 of the carriers M—M, thereby forcing the door outwardly of the door opening until it assumes the position shown in Figure 12. Inasmuch as the crank pin 79 and the extension 80 of each end member are engaged within the section 84 of the corresponding guide slot 82, further rotation of the shaft, in a contra-clockwise direction, as viewed in Figure 12, will cause swinging movement of the corresponding supporting arm R, thereby moving said arm to the position shown in Figure 13 and also withdrawing the door further from the door opening. During this movement, the crank pin 79 will move outwardly in the section 77 of the keeper slot 75 of the corresponding carrier M. While the crank pin is being guided in this slot, the curved end 89 of the corresponding latch plate S will be brought into overlapping relation with the curved abutment face 73 of the boss 72 of the carrier M. As will be evident, the latch plate S, while engaged with the abutment surface of the boss 72 serves to lock the parts together so that the arm R will be rotated in unison with the operating shaft D. During further rotation of the shaft D by means of the operating lever arm G, the door will be brought to the fully open position shown in Figure 14. The attendant then engages the operating lever arms G—G with the latch plate H. Inasmuch as the door is held against lateral movement by locking the lever arms G—G to the latch plate H, the door may be slid entirely clear of the door opening without danger of same becoming wedged against the side wall of the car. In closing the door, the operation is the reverse of that hereinbefore described, the attendant first sliding the door in front of the door opening and then rotating the operating shafts D—D by means of the operating levers G—G. Inasmuch as the sliding latch plates S—S lock the parts together, the supporting arms R—R will be rotated in unison with the operating shafts during the time that the shafts are rotated from the position shown in Figure 14 to that shown in Figure 13 and from the position shown in Figure 13 to that shown in Figure 12. When the mechanism assumes the position shown in Figure 12, the door will have been partly closed and latch plates S—S will have been freed from the locking surface of the bosses 72—72 of the supporting carriers M—M so that the free ends of the latch plates S—S may enter the pockets 74—74. During further rotation of the operating shaft D from the position shown in Figure 12 to that shown in Figure 11, the crank pins 79—79 of the end members P—P will travel laterally in the sections 76—76 of the keeper slots 77—77, thereby camming the door inwardly to the fully closed position shown in Figure 11. During this camming action, the crank pins 79—79 will travel to the right in the sections 83—83 of the guide slots 82—82 and the extensions 80—80 of the end members P—P will travel inwardly in the sections 84 of said guide slots. It is further pointed out that the crank pins 79—79 of the end members P—P are so positioned with refer-

ence to the pivot points of the arms R—R and the keeper slots 75—75 of the carriers M—M that the crank pins will freely enter the sections 77—77 of said slots while the supporting arms R—R are swinging inwardly to the position shown in Figure 13. When the door has been completely closed, as shown in Figure 11, the operating lever arms G—G are locked and sealed in the usual manner by means of the latch members K—K.

I have herein shown and described what I now consider the preferred manner of carrying out my invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; and means for moving said door to open or close the same including a manually actuated operating member movably mounted on the door, keeper means with respect to which the door is movable, movable means supporting the door on said carriers, fixed means on said operating member and movable therewith operatively connected to the movable supporting means for moving said door either into or out of the door opening; and additional fixed means on said operating member movable therewith and engageable with said keeper means for either prying the door open or forcing the same tightly closed.

2. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of keepers with respect to which said door is movable; movable supporting means for guiding the door into and out of the door opening; manually actuated operating means movably mounted on the door; means operatively connecting said operating means to the movable supporting means for actuating the latter through movement of the operating means to either move the door into the door opening to partially closed position or withdraw the door from the door opening after it has been partially opened; and keeper engaging means fixed on said operating means engageable with said keepers for either forcing the door tightly closed after it has been moved to said partly closed position, or prying the door partially open.

3. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; keeper means on each carrier; means on each carrier supporting the door and moving it into and out of the door opening; a manually actuated operating member on the door connected to said supporting means for actuating the latter to move said door into and away from the door opening; and keeper engaging means on said operating member engageable with said keeper means for either forcing the door tightly closed or prying the same open.

4. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; keeper means on each carrier; a supporting member movably mounted on each carrier, said member being connected to the door for guiding the door into and out of the door opening when said member is actuated; a manually actuated operating element movable to a limited extent with respect to the supporting member; means on said operating element engageable with the keeper means for either forcing said door into the door opening or prying the same free of said opening while the operating element is moved to said limited extent; and means for locking said operating element to said supporting member to actuate the latter to move said door into and out of the door opening.

5. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; keeper means on each carrier; means for moving the door with respect to the carrier; an operating member on the door; keeper engaging means on said operating member engageable with said keeper means to either force the door tightly closed or pry the same partly open when said operating member is actuated; and means for automatically locking the operating member to said door moving means for actuating the latter.

6. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track, each carrier having a keeper slot therein; a supporting arm swingingly mounted on each carrier; a rotary operating shaft on said door; means on said shaft engageable with the keeper slots of said carriers for either forcing said door into the door opening or prying the same free of said opening, during partial rotation of said shaft; and means controlled by operation of said shaft for locking the shaft to said arms to actuate the latter while said shaft is given another partial rotation to either move said door into the door opening or withdraw the same therefrom.

7. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; a rotary operating shaft on the door; means for rotating said shaft; means connected to said shaft and actuated thereby for moving said door with respect to the carrier into said door opening to partially closed position; and means controlled by the rotation of said shaft for disconnecting said shaft from said connecting means to permit rotation of said shaft with respect to the connecting means; and means on said shaft and rotatable therewith engageable with the carrier during further rotation of the shaft for forcing said door into said door opening to fully close said door.

8. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; a rotary operat-

ing shaft on the door; means for rotating said shaft; means on said shaft and rotatable therewith, engageable with the carrier for prying said door open during a predetermined partial rotation of said shaft; means connected to the carrier for withdrawing said door from the door opening; and means controlled by rotation of said shaft for automatically connecting the shaft to said means for withdrawing the door to actuate said last named means upon further rotation of said shaft.

9. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; top and bottom carriers slidably guided on said tracks; door supporting arms, each arm being pivotally connected at one end to one of said carriers; an operating shaft rotatably mounted on the door, said shaft being connected to the arms to support and guide the door for movement toward and away from the door opening; keeper means on each carrier; keeper engaging means on the shaft engageable with said keeper means during a predetermined period of partial rotation of the shaft; and means controlled by the rotation of said shaft for locking the shaft rigidly to said arms to swing said arms during another period of partial rotation of said shaft to actuate the door.

10. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; carriers slidably guided on each track; supporting arms for the door, each arm being pivotally connected at one end to one of said carriers, each arm having an L-shaped slot at the other end thereof; an operating shaft rotatably mounted on the door; a crank member on each end of the shaft; a crank pin at the outer end of each crank member extending through the L-shaped slot of one of said arms; keeper means on each carrier engageable by the corresponding crank pin; and a pin at each end of said shaft coaxial with the axis of rotation of said shaft, each of said last named pins engaging with the L-shaped slot of one of said arms.

11. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; supporting hinge arms for the door, each arm being pivoted at one end on one of said carriers, each arm being slotted at the other end, each of said slots having a branch disposed at an angle to the main portion of said slot; keeper means on each carrier; a rotary operating shaft mounted on the door, said shaft having a pair of spaced pins at each end thereof, said pins of each pair extending into the guide slot of one of said hinge arms, and one of said pins of each pair being engageable with the keeper means to either force said door tightly closed or pry the same partly open when said shaft is rotated.

12. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; hinge arms for supporting the door, each hinge arm being swingingly mounted at one end on one of said carriers; keeper means on each carrier; a rotary operating shaft mounted on the door, said shaft being connected to the hinge arms; means on said shaft having shouldered engagement with the hinge arms during rotation of said shaft to swing said arms and effect opening or closing of the door; and means on said shaft engageable with said keepers during rotation of said shaft for either forcing the door tightly closed or prying the same open.

13. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; hinge arms supporting the door, each arm being pivotally connected at one end to one of said carriers; a rotary shaft mounted on the door; means on said shaft rotatable therewith connecting the same to said hinge arms and having shouldered engagement with the arms during a predetermined period of partial rotation of said shaft for swinging said arms on said pivots, said last named means also having shouldered engagement with the carriers during another period of partial rotation of said shaft to either force the door tightly closed or pry the same open.

14. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; hinge arms supporting the door, each of said arms being pivotally connected at one end to one of said carriers; a rotary shaft mounted on the door, said shaft being movable with respect to said arms during a predetermined period of partial rotation of said shaft; and means on said shaft having shouldered engagement with said arms during another period of rotation of said shaft to effect swinging movement of said arms.

15. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; hinge arms supporting the door, each of said arms being pivotally connected at one end to one of said carriers; a rotary shaft mounted on the door, said shaft being movable with respect to said arms during a predetermined period of partial rotation of said shaft; means on said shaft having shouldered engagement with said arms during another period of rotation of said shaft to effect swinging movement of said arms; and means controlled by relative rotation of the shaft and said door for holding said shaft in said shouldered engagement during said last named period of partial rotation of said shaft.

16. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; hinge arms supporting the door, each arm being pivotally connected at one end to one of said carriers; a rotary shaft mounted on the door;

means on said shaft connecting the same to said hinge arms and having shouldered engagement with the arms during a predetermined period of partial rotation of said shaft for swinging said arms on said pivots, said last named means also having shouldered engagement with the carriers during another period of partial rotation of said shaft to either force the door tightly closed or pry the same open; and means controlled by relative rotation of the shaft and said door for holding said shaft in said shouldered engagement during said first named period of partial rotation.

17. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidably guided on each track; hinge arms supporting the door, each of said arms being pivotally connected at one end to one of said carriers; a rotary shaft mounted on the door, said shaft being movable with respect to said arms during a predetermined period of partial rotation of said shaft; means on said shaft having shouldered engagement with said arms during another period of rotation of said shaft to effect swinging movement of said arms; and fixed means on the door having shouldered engagement with said arms during said last named period of rotation of the shaft for holding said first named means in said shouldered engagement.

18. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidingly guided on each track; hinge arms for supporting the door, each of said arms being pivotally connected at one end to one of said carriers and having a locking slot at the other end; an operating shaft rotatably mounted on said door, said operating shaft being connected to each of said arms at the end thereof which carries the locking slot; eccentric means on each end of said shaft movable lengthwise of the slot of the corresponding arm, said eccentric means having shouldered engagement with the corresponding carrier to actuate the door; a lug member at each end of the shaft spaced from the corresponding eccentric means; means on each arm for guiding the corresponding lug into said slot and into shouldered engagement with the wall thereof to effect rotary movement of said arm; means on said carriers with which said eccentric means is engageable to force the door either open or closed; and fixed means on the door having shouldered engagement with said arms during a predetermined partial rotation of the shaft for holding the arms and shaft against relative bodily displacement during said predetermined partial rotation of the shaft.

19. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidingly guided on each track, each carrier having a keeper slot therein; hinge arms for supporting the door, each of said arms being pivoted at one end to one of said carriers, each of said arms having a guide slot at the other end, said guide slot having a section thereof disposed at right angles to the axis of said arms, said slot having another section disposed at an angle to said first named section and communicating therewith, each arm also having a straight guide face parallel to said first named section and a curved abutment seat adjacent to said face; a rotary operating shaft mounted on the door, said shaft having a coaxial extension and an eccentric lug at each end thereof, said extension and lug at each end of the shaft being guided respectively in the first and second named sections of said slot of the corresponding hinge arm; and fixed guide projections on the door, each projection having a straight face slidable on the straight guide face of the corresponding arm, and a curved face concentric with the operating shaft and rotatably engageable with the curved abutment seat of said arm, said eccentric lug being also engageable with the keeper slots of the corresponding carrier to actuate the door.

20. In a door construction for refrigerator cars having a wall member provided with a door opening, the combination with a door adapted to close said opening; of guide tracks on said wall member above and below said door opening; a carrier slidingly guided on each track, each carrier having a keeper slot therein; hinge arms for supporting the door, each of said arms being pivoted at one end to one of said carriers, each arm having a guide slot at the other end, said guide slot having a section thereof disposed at right angles to the longitudinal axis of said arm, and another communicating section disposed at an angle to said first named section; a rotary shaft mounted on the door, said shaft having a coaxial extension and an eccentric lug at each end thereof, said extension and lug being guided respectively in the first and second named sections of said slot of the corresponding hinge arms, said eccentric lugs being also engageable with the keeper slots of the carriers to actuate the door; a boss on each carrier having an outer curved abutment face eccentric with the pivotal axis of the corresponding arm; and a sliding latch member pivotally connected to said eccentric lug, said latch member having a pin thereon slidably guided in said second named section of the slot, said sliding latch member having a curved end face engageable with the curved abutment face of the boss of the corresponding carrier to hold the shaft and cooperating arm against relative bodily displacement, said boss being recessed to accommodate the latch element for movement and permit release of the same when said eccentric lug is engaged within the keeper slot of the carrier.

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