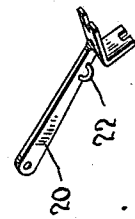
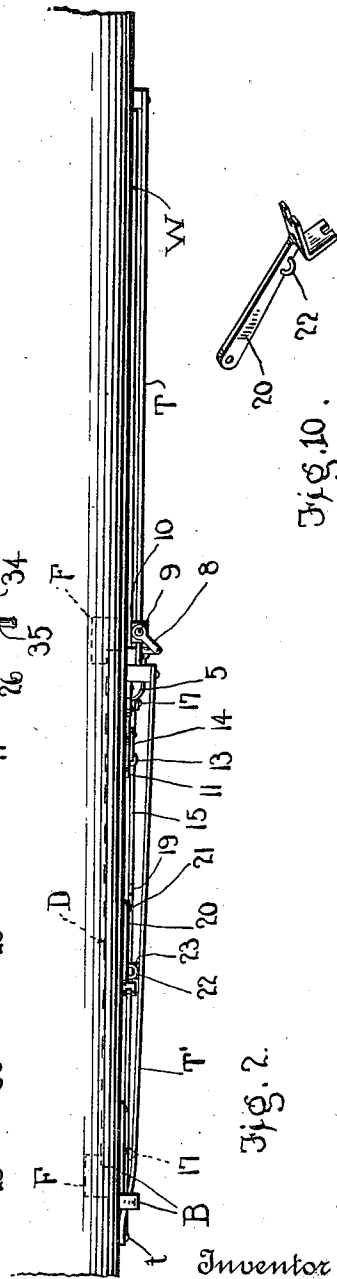
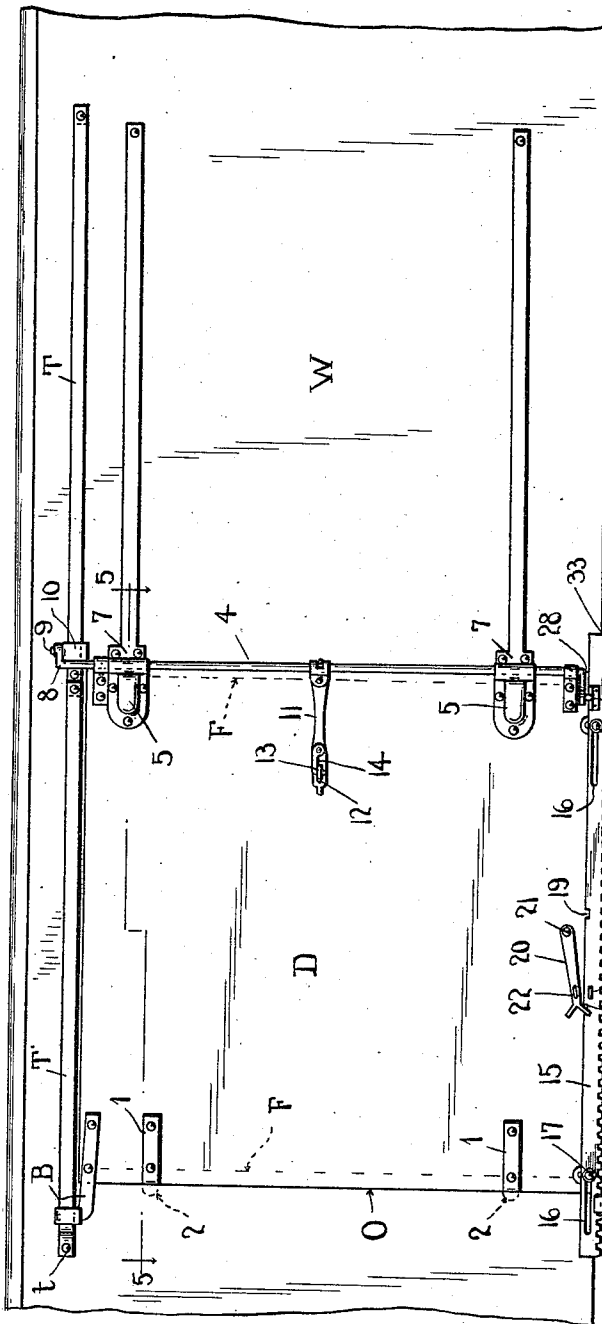


W. GRADICK, SR.
CAR DOOR MECHANISM.
APPLICATION FILED MAY 23, 1912.

1,045,279.

Patented Nov. 26, 1912.

3 SHEETS—SHEET 1.



Witnesses
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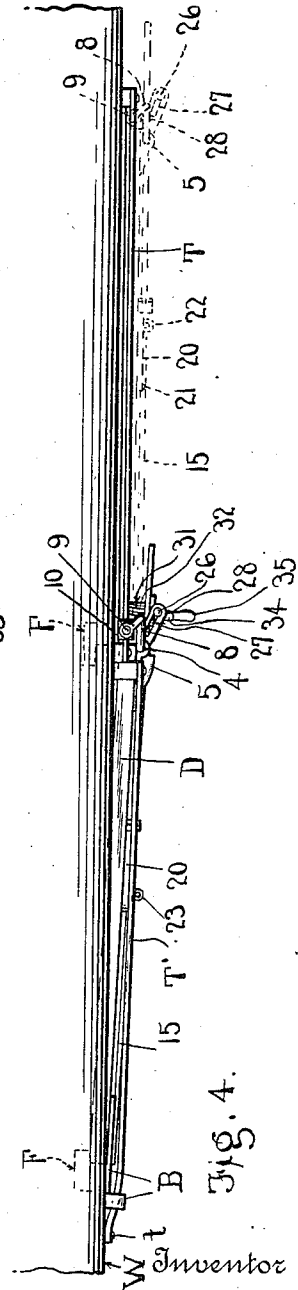
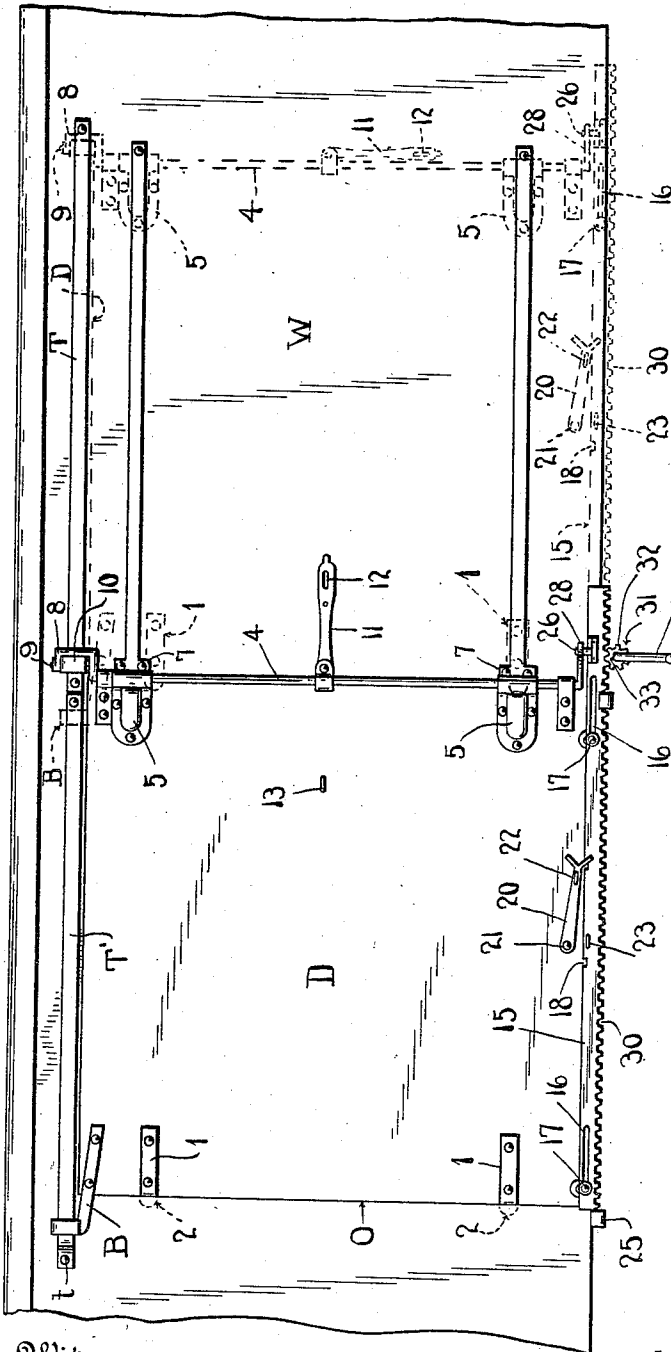
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3 SHEETS—SHEET 2.



Witnesses

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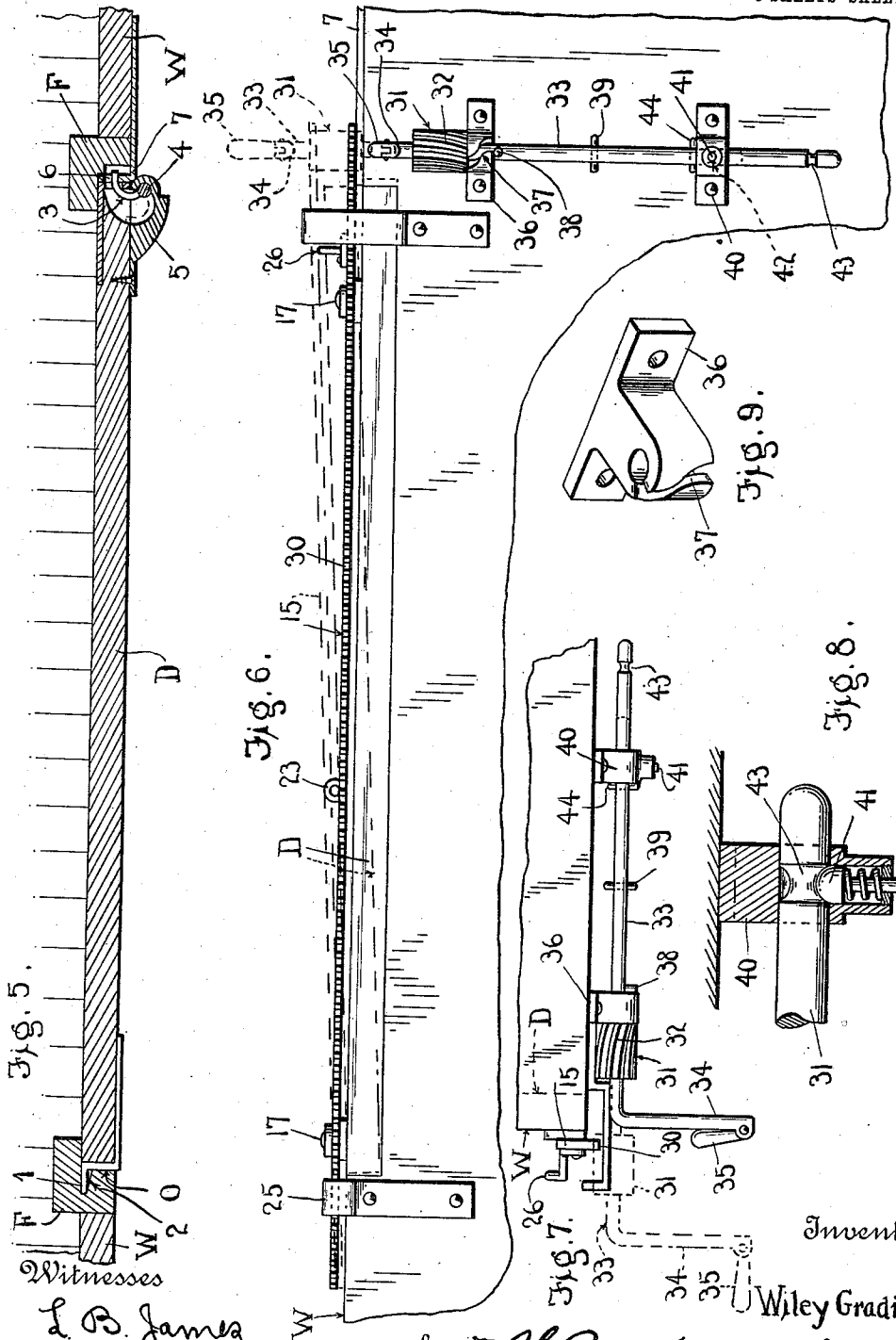
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3 SHEETS-SHEET 3.



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UNITED STATES PATENT OFFICE.

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CAR-DOOR MECHANISM.

1,045,279.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed May 23, 1912. Serial No. 699,191.

To all whom it may concern:

Be it known that I, WILEY GRADICK, Sr., a citizen of the United States, residing at Tyler, in the county of Smith and State of Texas, have invented certain new and useful Improvements in Car-Door Mechanism; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to sliding car doors, and more especially to those which are link supported and laterally movable; and the object of the same is to improve the supporting and fastening mechanism for such a door and to provide means for opening and closing it mechanically. This object is accomplished by use of a hanger especially adapted to the remainder of the mechanism, a fastener including a rock shaft having a cranked upper end engaging said hanger and hooks on the shaft engaging sockets in the door frame, and a lock including a sliding bar moved by said rock shaft and means for securing the bar in one of two positions.

The invention also contemplates the use of means or mechanism for moving the door—both opening and closing it mechanically.

The details are more fully set forth and claimed in the following specification, and the preferred form of my invention is illustrated in the accompanying drawings wherein—

Figure 1 is a side elevation of a portion of a box car whose door is equipped with my improvement, the same being closed; and Fig. 2 is a plan view of the parts shown in Fig. 1; Figs. 3 and 4 are respectively similar views with the edge of the door moved a little out of the door opening and ready to be opened, and both views show the door in dotted lines as having been open; Fig. 5 is an enlarged horizontal section on the line 5—5 of Fig. 1; Fig. 6 is a bottom plan view illustrating the door moving mechanism, showing it in full lines as pushed under the car and out of operative position, and in dotted lines as drawn out ready to actuate the door; Fig. 7 is an end elevation of the lower portion of the car, giving a side elevation of the parts shown in Fig. 6; Figs. 8

and 9 are details of parts of this mechanism as will be hereinafter described; Fig. 10 is a perspective detail of the latch.

The car wall W has a door opening O over which the door D is to be moved; and as this invention contemplates the use of a door of that character which sets into the door opening flush with the outer face of the car wall, the door frame F is rabbeted as shown and the hanger must be of such construction as will cause the door to move into and out of position when it is slid aside. To this end it comprises members carried by the upper corners of the door, one of them by a bracket B and the other by a crank shaft to be described below, and a track made in two sections T T', the former of which is parallel with the car wall and the latter of which extends across the upper edge of the door opening and inclines obliquely inward and is secured to the car wall at the point marked *t*. Thus when the door is moved outward to expose the door opening, one member travels on the straight track alongside the car wall and the other member travels on the inclined track so that what might be called the rear edge of the door is caused to move outward and clear said wall; and when the door is moved in the opposite direction this rear edge travels ahead of the body of the door and swings toward the car wall and into the rabbeted frame, while the other edge of the door travels inward to a point opposite the other rabbeted frame bar, ready to be swung in by the mechanism yet to be described.

The fastener forming a part of the present invention consists of tongues 1 at the rear edge of the door engaging sockets 2 in the rabbeted frame at that side when the door is closed; and hooks 3 mounted on an upright rock shaft 4 at the other edge of the door, standing within metallic housings or casings 5 on the door when they are idle, and adapted to engage sockets 6 in keeper-plates 7 secured in the rabbeted edge of the outer frame bar of the door when the latter is closed and the rock shaft is turned in the proper direction and to the proper extent. For this purpose said shaft is mounted in bearings which may well be part of said housings 5 as illustrated, it is cranked at its upper end as shown at 8 and

pivottally connected at 9 with a box 10 which contains the hanger member at this corner of the door, and it has a handle or lever 11 by which it may be rocked. This handle may well have a slot 12 passing over a loop 13 on the door, and the lever may carry a pivoted hook 14 to engage said loop to hold the lever and hence the rock shaft in position to keep the door closed; or a seal wire can be passed through the loop outside the slot in the lever as is well understood to those familiar in this art.

To open the door it is only necessary to unlatch the lever from the loop, and swing it to the right; this rocks the shaft in its bearings and causes it bodily to move around its pivot to the wheel block at the point 9, so that this end of the door is swung out of the rabbeted door frame—the hooks 3 being meanwhile turned out of engagement with the recessed keeper-plates 7. The door may then be moved aside by hand or otherwise, and as it moves the tongues 1 draw out of the sockets 2 in the other side bar of the door frame. In restoring the door to closed position the tongues reengage these sockets, and movement of the lever in the opposite direction rocks the shaft so that its cranked upper end causes the edge of the door to move back into place in the door frame and the hooks on the rock shaft to reengage the sockets in the keeper-plates; after which the hand lever may be hooked or sealed over the loop 12 on the door. A lock for this improved door is, however, more frequently employed in connection with the mechanism about to be described and by means of which the lower edge of the door is reliably held closed so as to resist the expansive force of the contents of the car, and obviously a lock on the mechanism along the lower edge of the car door will be within easy reach of an operator standing on the ground.

The numeral 15 designates a slide, here shown as a bar of strap metal having two slots 16 moving over headed bolts 17 seated in the door near its lower edge, and the upper edge of the slide is provided with two notches 18 and 19 adapted alternately to be engaged by either extremity of the head of a T-shaped latch 20 pivoted at 21 to the door. This latch when turned to one position engages one of the notches, and when turned to the other position engages the other of said notches, and in either position it prevents the slide from moving in one direction. Its body may well carry an eye 22 and the slide another eye 23, and when these eyes come in juxtaposition a padlock or seal may be passed therethrough to firmly lock the slide and hence the door. The left end of the slide when moved to the left passes through a keeper 25 on the door frame adjacent this

edge of the door. The right end of the slide carries a hook 26 moving in a slot 27 formed in an arm 28 bent outward from and constituting an integral part of the rock shaft above mentioned. It follows from this construction that when the shaft is rocked in its bearings, the slotted arm causes the slide to move on its guides and of course it cannot move until the latch is disengaged from the notch which holds it against movement, and this cannot be done without first removing the padlock or seal. Having done so and thrown the latch over to the opposite position, then when the rock shaft is rotated by means of the lever, the slotted arm moves to slide back so that the tip of the latch falls into the opposite notch and holds the slide and therefore holds the rockshaft against a movement in the reverse direction. When it is desired to close the door, the latch 20 must be again turned over, and then when the door is closed by means of the lever the rock shaft can turn to move its hooks into the slotted keeper-plate in a manner described above.

As it frequently happens that the car door sticks in place and it is difficult to turn the rock shaft by the hand lever or by means of the slotted arm, I preferably employ a door mover capable either of being used in conjunction with the mechanism above described or with almost any type of sliding door which has a rack bar across its lower edge. In the present instance the bar 15 is provided with teeth 30 so that it becomes a rack bar, and 31 is a rather long gear wheel having teeth 32 capable of engaging those in the rack bar and by preference made slightly curved throughout their length (as shown exaggerated in Figs. 6 and 7) on an arc struck around the remote edge of the car door, so that the teeth 32 will accurately engage the teeth 30 in the rack bar 15 in any position of the door itself. The long gear 31 is mounted fast on a shaft 33 having at its front end a crank 34 and a pivoted handle 35 adapted to fold against the crank so as to be out of the way. This shaft is journaled in bearings beneath the car body, the forward bearing 36 having a spiral slot 37 through its lower side so that a pin 38 in the shaft may pass through said slot, and the shaft having a stop pin 39 fixed thereon in position to come in contact with this bearing when the shaft is drawn outward to its fullest extent. The rearmost or innermost bearing 40 by preference carries a spring-actuated clasp or bolt 41 which is adapted to engage one of two grooves 42 and 43 formed in the shaft in proper position to hold the latter withdrawn or retracted; and the shaft also carries a stop pin 44 for contacting with this bearing when it is pushed inward, so as to prevent the crank handle from being pushed inward too far. When

all parts of this mover are pushed inward as seen in Fig. 6 the gear wheel is entirely out of engagement with the rack bar, and the door may be opened and closed by hand and fastened or locked in the manner above described. If now the door should become stuck so that it cannot be opened by the hand lever or slotted arm, the operator disengages the spring bolt from the proper groove in the shaft, grasps the crank and draws the shaft forward in its bearings which causes the front pin to move through the slot 37 in the front bearing 36, and finally causes the gear wheel 31 to engage the teeth 30 of the rack bar; after which by manipulating the crank handle by means of its hand piece 35, the rack bar is caused to move to the right, thus swinging the slotted arm and the rock shaft, disengaging the tip of its hooks from the keeper plate, and causing the opening movement of the door in the manner above described. Then or later the shaft may be pushed back out of the way, but assuming that it remained in this position, it can be used for closing the door. This is effected by rotating the shaft in the opposite direction so that its gear wheel causes the rack bar to travel to the left, carrying the door with it until the prongs 1 enter the sockets 2, when the continued movement of the rack bar causes the slotted arm to turn the rock shaft, and the cranked upper end of the latter causes this edge of the door to move inward and seat within the rabbeted frame—the teeth on the rack bar meanwhile sliding along the teeth on the long gear wheel. The spring bolt (if it is used) is then disengaged from the rear-most groove in the shaft, and the latter pushed inward in its bearing until the rear pin 44 strikes the rear bearing 40 and the front pin 38 passes through the curved slot 37 in the front bearing and throws the crank 34 downward; and by folding the hand piece upward against the crank it is entirely out of the way. Thereafter the door can be manipulated by hand if possible, or if not possible the crank mechanism can be brought into action at any time to move the door. Thus it will be seen that this door mover coöperates very nicely with the mechanism above described, and in no way interferes with the fastening or locking of the door or with its movement in either direction by means of the hand lever or the slotted arm. As the front pin 38 in the shaft stands normally in rear of the front bearing 36 it is quite possible to omit the spring bolt; or if the latter be employed it is purposely placed as near the front of the car as possible so that the operator can reach it with convenience.

All the parts of this device and of the fastening and locking mechanism for the door are of the desired materials, and their

sizes and proportions are matters of little moment.

Changes in the details may be employed so long as the principle of the invention is the same, and parts may be used without other parts if possible.

What I claim as new is:

1. In a car door mechanism, the combination with a car wall having an opening, a door frame surrounding the same and having sockets in one side bar, and the door; of a track, an upright rock shaft journaled on the door and cranked at its upper end, a block pivoted to the crank, a wheel journaled in the block and traveling on the track, hooks fast on said shaft and adapted to engage said sockets, means for actuating said shaft, a slotted arm projecting rigidly from the latter, a bar slidably mounted across the door and having a hook engaging the slot in said arm, and a keeper on the door frame with which one end of said bar is engaged when the shaft is actuated to close the door.

2. In a car door mechanism, the combination with a car wall having an opening, a door frame surrounding the same, and the door; of a track above the opening, bearings on the front edge of the door, an upright rock shaft journaled therein and cranked at its upper end, a block pivoted to the crank, a wheel journaled in the block and traveling on the track, a bracket carried by the rear upper corner of the door, a wheel journaled therein and traveling on the track, means for actuating said shaft, a slotted arm projecting rigidly from the latter, a bar slidably mounted across the door and having a hook engaging the slot in said arm, and a keeper on the door frame with which one end of said bar is engaged when the shaft is actuated to close the door.

3. In a car door fastener, the combination with a car wall having an opening therein, a frame surrounding the same and having sockets in its side bars, the door having tongues at one edge to engage one of said sockets, combined housings and bearings at its other edge, an upright shaft journaled in said bearings and having hooks adapted to be turned into said housings or into engagement with the socket in this edge of the frame, a track, door-supporting rollers thereon, and connections between one roller and said shaft; of a hand lever projecting rigidly from said shaft, a slotted arm also projecting rigidly therefrom, headed studs projecting from the door, a bar having slots sliding on said studs, a hook on said bar engaging the slot in said arm, and a keeper on the door frame with which one extremity of the bar engages when the shaft is turned to engage the hooks with their sockets.

4. In a car door lock, the combination

with a car wall having an opening therein, a frame surrounding the same and having sockets, the door having bearings at its edge, an upright shaft journaled in said bearings and having hooks adapted to be turned into said sockets in the frame, a track, a door supporting roller thereon, and connections between it and said shaft; of an arm projecting from said shaft, a bar slidably mounted on the door and having two notches in its upper edge, a hook on this bar slidably engaging said arm, a keeper on the door frame with which one extremity of the bar engages when the rock shaft is turned, and a T-shaped latch pivoted to the door so that its head is adapted to engage one of said notches in either of its extreme positions.

5. In a car door lock, the combination with a car wall having an opening therein, a frame surrounding the same and having sockets in its side bars, the doors having tongues at one edge to engage some of said sockets, combined housings and bearings at its other edge, an upright shaft journaled in said bearings and having hooks adapted to be turned into said housings or into engagement with the sockets in this edge of the frame, a track, door supporting rollers thereon, and connections between one roller and said shaft; of a slotted arm projecting from said shaft, a bar slidably mounted on the door and having two notches in its upper edge, a hook on this bar engaging the slot in said arm, a keeper on the door frame with which one extremity of the bar engages when the hooks on the rock shaft are turned into their sockets, a T-shaped latch pivoted to the door so that its head is adapted to engage one of said notches in either of its extreme positions, and means for locking the latch to the bar when its head is so engaged.

6. The herein described car door mover, comprising alined bearings beneath the body of a car, a shaft slidably and rotatably mounted therein and having a crank, and a long gear fast on said shaft; combined with a door, a rack bar thereon with which the gear is adapted to engage when the shaft is drawn outward, and means for supporting the door on the car so as to permit it to be moved outward from the door opening and slid aside.

7. The herein described car door mover, comprising alined bearings beneath the body of a car, one of them provided with a spiral slot, a shaft slidably and rotatably mounted therein and having a crank, a pin through said shaft adapted to be moved through said slot, and a long gear fast on said shaft and having its teeth disposed spirally; combined with a door, a rack bar thereon with which the gear is adapted to engage when the shaft is drawn outward, and means for support-

ing the door on the car so as to permit it to be moved outward from the door opening and slid aside.

8. The herein described car door mover, comprising alined bearings beneath the body of a car, one of them provided with a spiral slot, a spring-actuated bolt through another bearing, a shaft journaled in said bearings and having a crank at its front end, a hand-piece pivoted to the crank, the body of the shaft having two grooves adapted respectively to be engaged by the tip of said bolt, a pin through said shaft adapted to pass through said spiral groove as the shaft is pushed inward for the purpose set forth, and a long gear fast on said shaft; combined with a door, a rack bar thereon with which the gear is adapted to engage when the shaft is drawn outward, and means for supporting the door on the car so as to permit it to be moved outward from the door opening and slid aside.

9. The herein described car door mover, comprising alined bearings beneath the body of a car, a spring-actuated bolt through one of said bearings, a shaft journaled in said bearings and having a crank at its front end, a hand-piece pivoted to the crank, the body of the shaft having two grooves adapted respectively to be engaged by the tip of said bolt, and a gear fast on said shaft; combined with a door, a rack bar thereon with which the gear is adapted to engage when the shaft is drawn outward, and means for supporting the door on the car so as to permit it to be moved outward from the door opening and slid aside.

10. The herein described car door mover, comprising bearings beneath the body of a car, a shaft slidably and rotatably mounted in said bearings and having a crank at its front end, a long gear fast on said shaft, and pins through the shaft whereof the outermost passes limiting the sliding movement of the shaft through its bearings; combined with a door, a rack bar thereon with which the gear is adapted to engage when the shaft is drawn outward, and means for supporting the door on the car so as to permit it to be moved outward from the door opening and then slid aside.

11. In a car door mover, the combination with the door, a rack bar thereon, and a support for the door permitting it to be moved out from the door opening in the car and thence to the side; of bearings beneath the body of the car, a shaft slidably and rotatably mounted therein and having a crank handle, a long gear fast on the shaft and having its teeth curved in an arc struck around the remote edge of the door, and means for limiting the sliding movement of the shaft through its bearings.

12. In a car door mover, the combination with the door, a rack bar thereon, and a sup-

port for the door permitting it to be moved out from the door opening in the car and thence to the side; of two alined bearings beneath the body of the car, one of them
5 having a spiral slot, a shaft slidably and rotatably mounted in said bearings and having a crank handle, a long gear fast on said shaft and having its teeth struck on a curve around the remote edge of the door, and
10 three pins through the shaft whereof the outermost passes through said curved slot as the shaft is pushed inward and the others limit the sliding movements of the shaft.

13. In a car door mechanism, the combination with the car wall having a door opening, the door, and fastening mechanism therefor including an upright rock shaft journaled across the front edge of the door and having a slotted radial arm at its lower
20 end, a rack bar slidably mounted across

the lower edge of the door, a hook on the bar engaging the slot in said arm, and a keeper on the door frame with which the end of said bar is engaged as the door is closed and fastened; of moving mechanism for
25 said door comprising a shaft slidably and rotatably mounted in bearings across the bottom of the car body and having a crank handle at its front end, and a long gear fast on said shaft and adapted to engage
30 said rack bar when the shaft is drawn outward.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILEY GRADICK, Sr.

Witnesses:

ALEX WOLDERT,
JANET CALDWELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."