Sept. 4, 1928. 1,682,946

W. E. WINE

CAR DOOR LOCKING DEVICE

Filed March 17, 1922

2 Sheets-Sheet 1

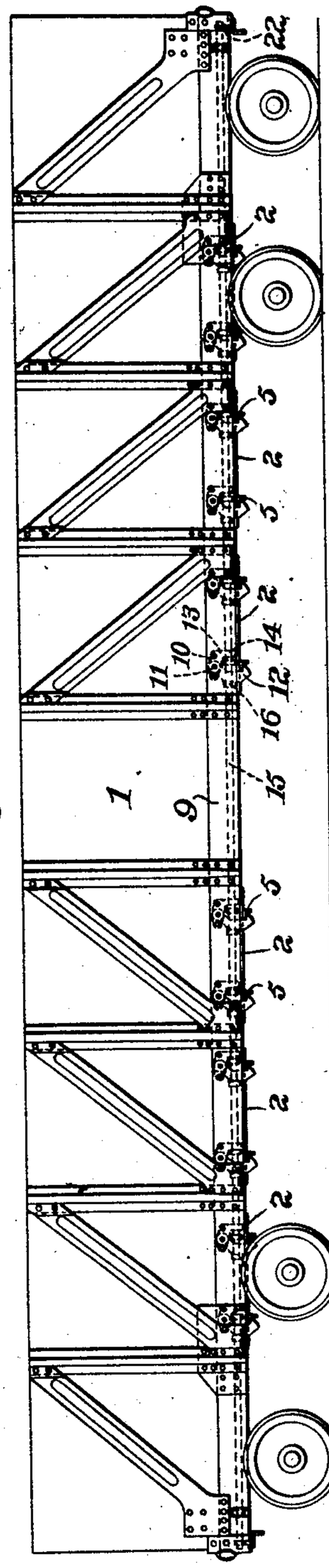

Fig. 1.

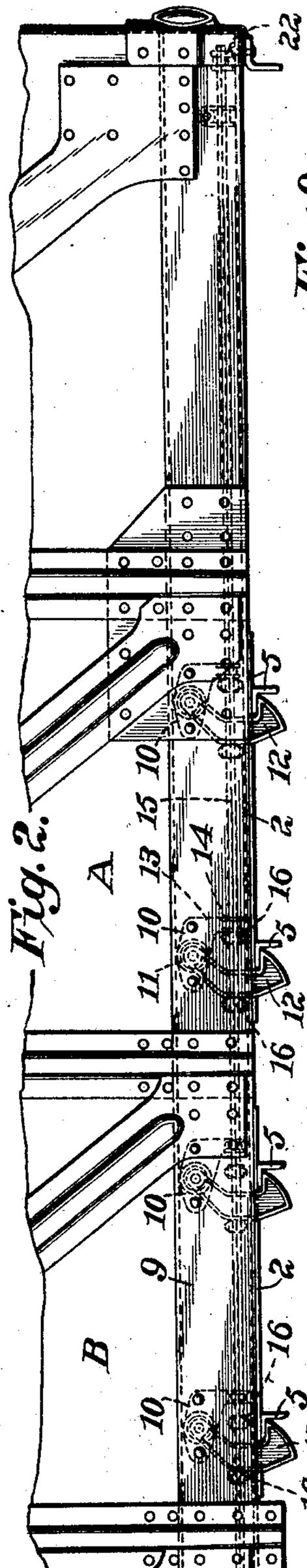

Fig. 2.

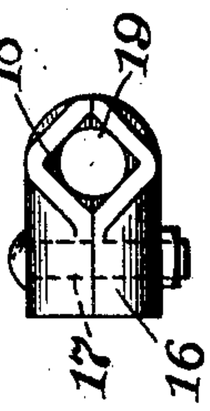

Fig. 9.

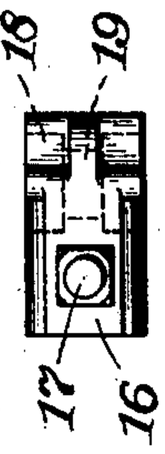

Fig. 10.

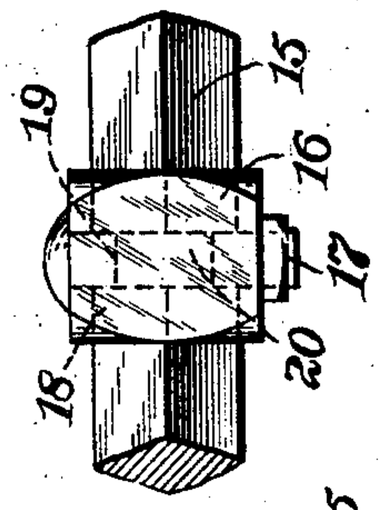

Fig. 8.

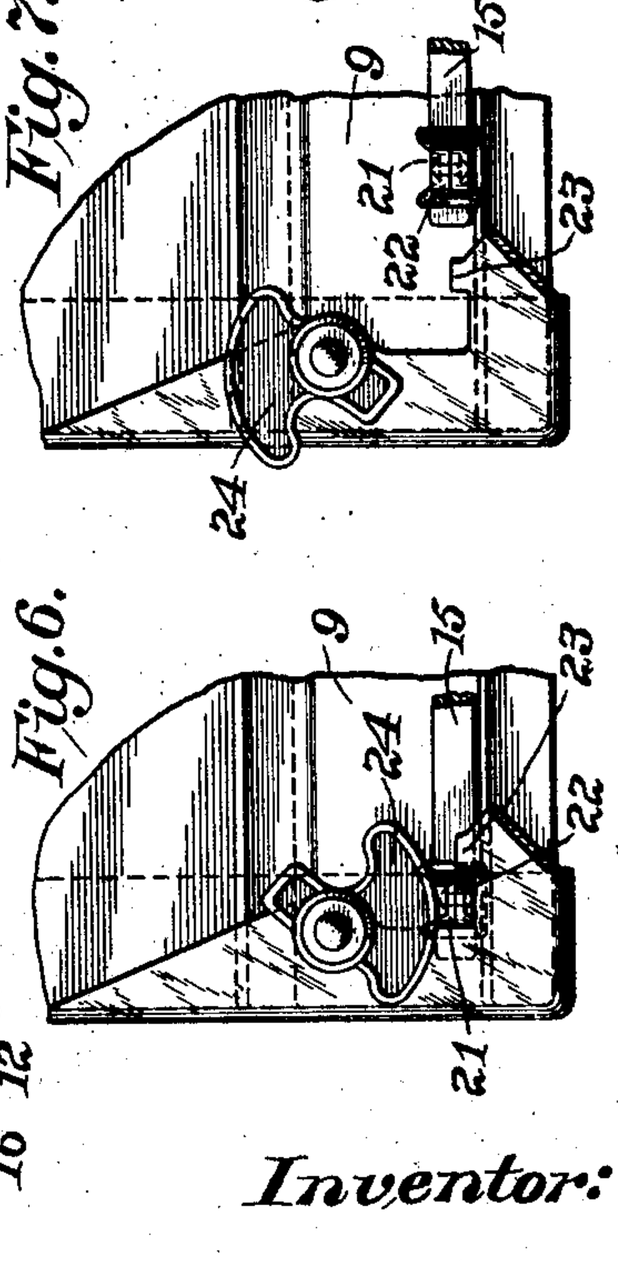

Fig. 7.

Fig. 6.

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2 Sheets-Sheet 2

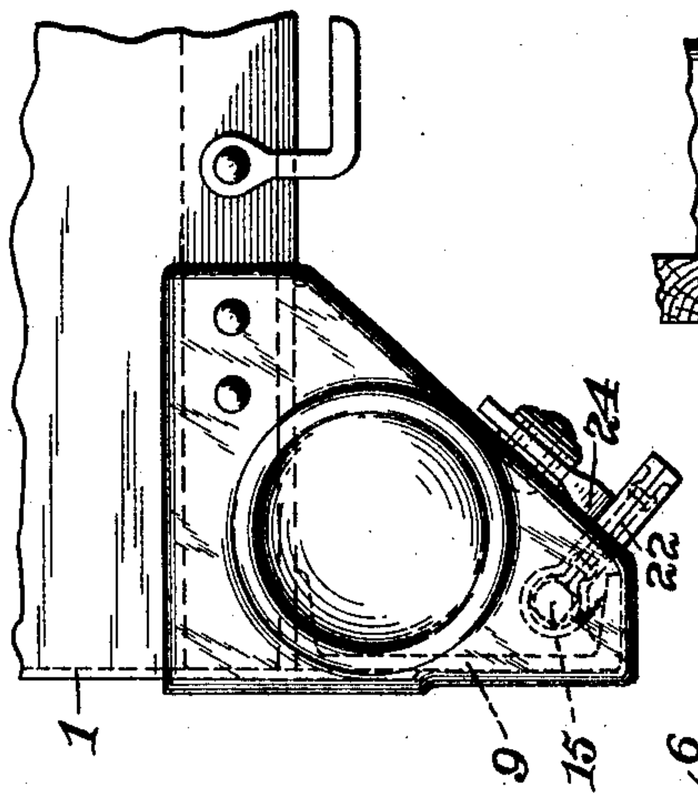


Fig. 5.

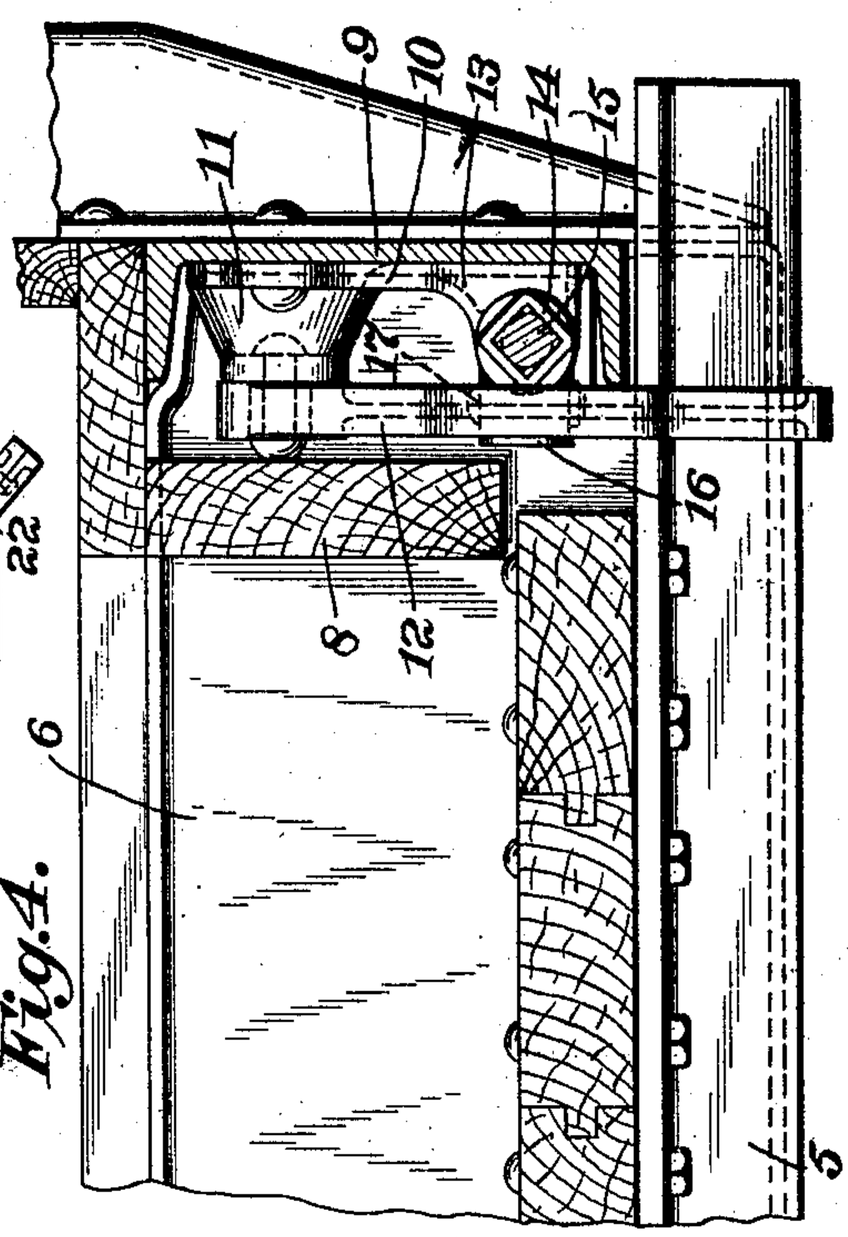


Fig. 4.

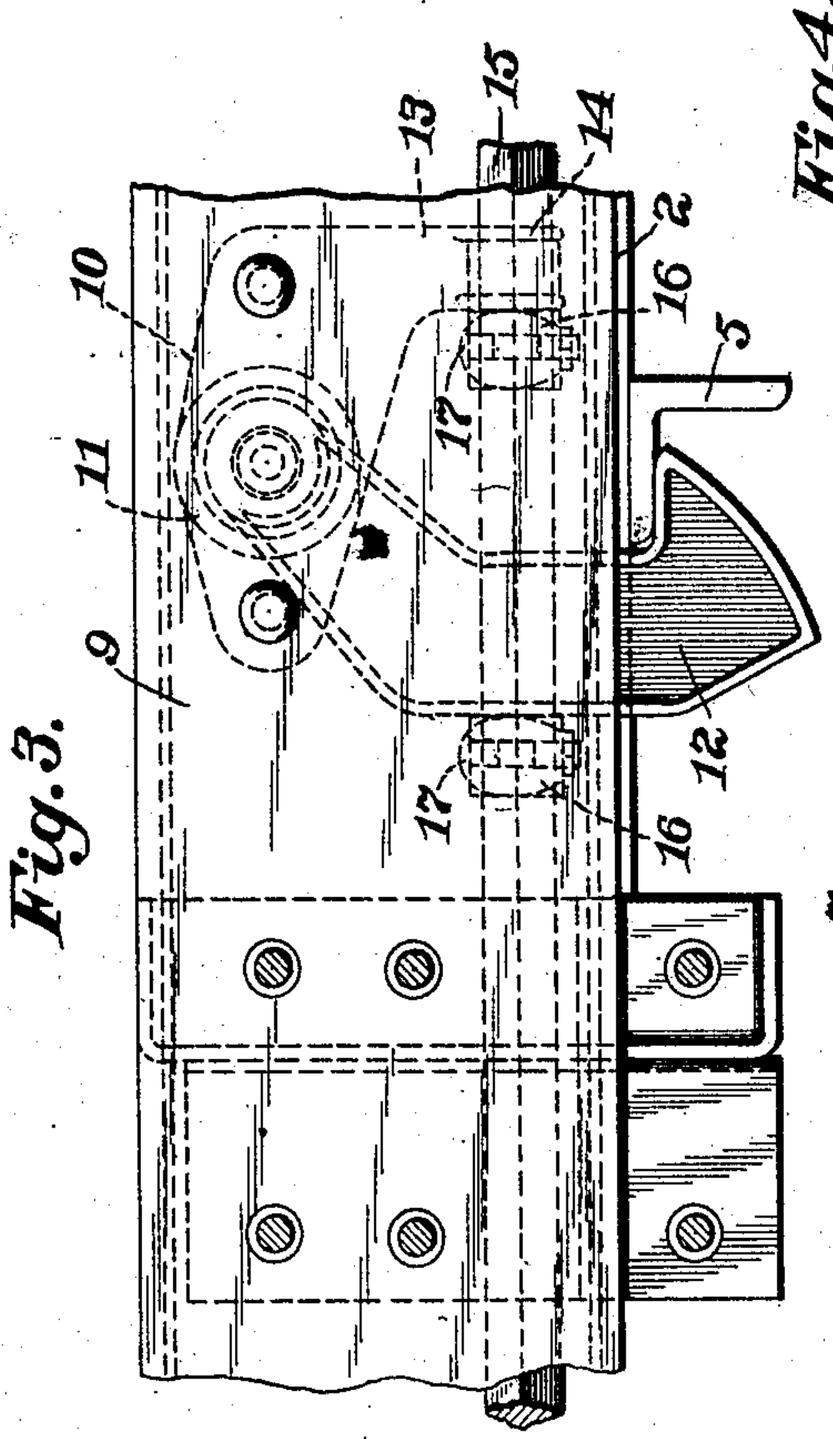
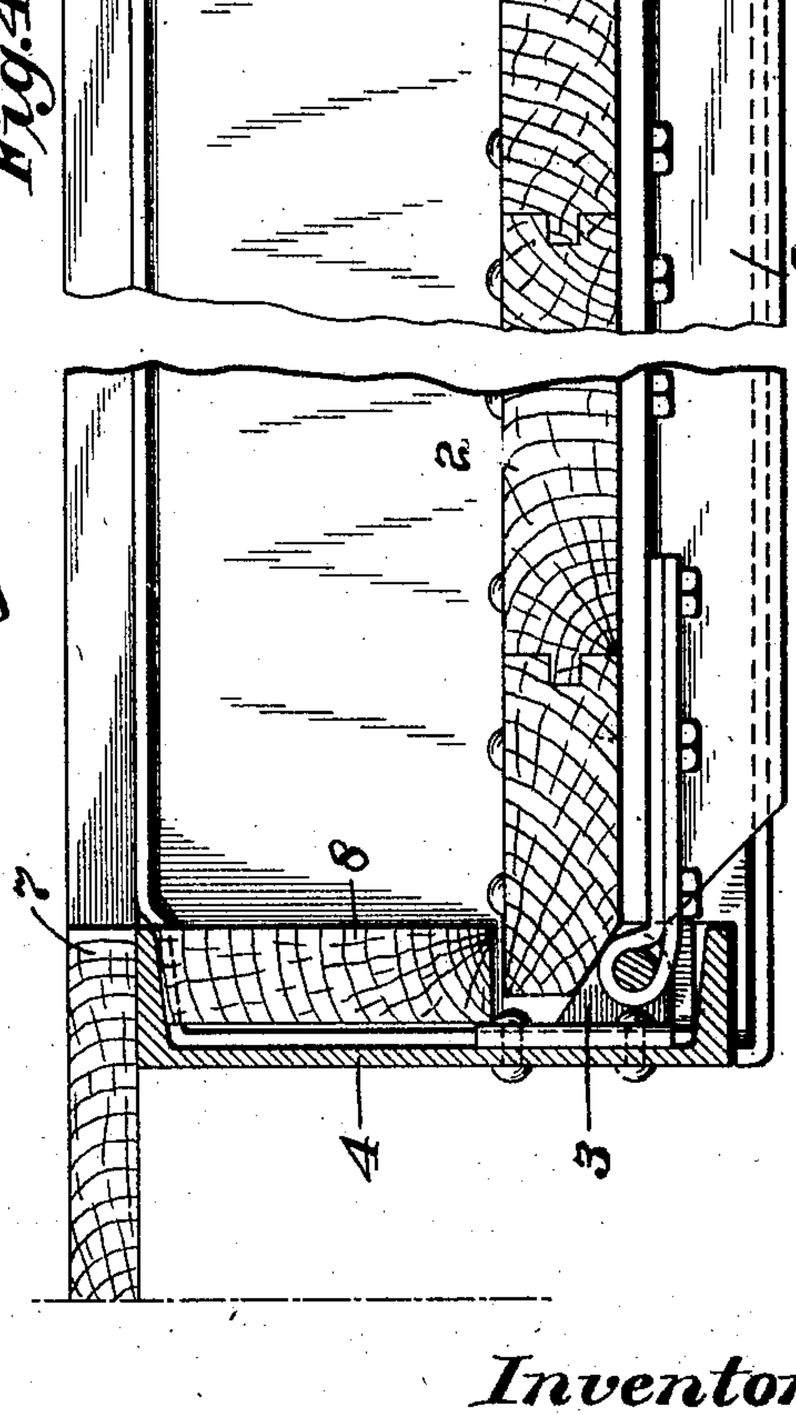


Fig. 3.



Inventor:

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Patented Sept. 4, 1928. 1,682,946

UNITED STATES PATENT OFFICE.

WILLIAM E. WINE, OF TOLEDO, OHIO.

CAR-DOOR-LOCKING DEVICE.

Application filed March 17, 1922. Serial No. 544,416.

My invention relates to new and useful improvements in supporting and locking devices for freight car doors, and has for its object to provide an advantageous construction involving the combination of a plurality of hooks pivotally mounted on the side of the car body, a shaft extending longitudinally of the car body provided at predetermined intervals with members adapted to cooperate with the hooks, the car doors being equipped with arms or brackets adapted to be engaged by the respective hooks to thereby support the doors in closed position, and the members on the shaft which cooperate with the hooks being capable of forcing said hooks into or out of engagement with the brackets carried by the doors when the longitudinally extended shaft is shifted in the proper direction to effect the result desired.

Another object of the invention is to provide a supporting and locking device for the drop doors of a freight car permitting the latter to drop successively and allowing any of the doors to be closed and supported in any order desired.

Still another object of the invention is to provide means for readily locking against longitudinal movement and quickly releasing a longitudinally extending shaft which is slidably mounted in brackets secured to the car side sill and is furnished with means for successively actuating pivoted hooks employed for supporting drop doors of a car.

A still further object of the invention is to provide a locking device which may be readily attached to freight cars having drop bottom doors, which is comparatively cheap to manufacture, is easily assembled, and is efficient in service.

A primary feature of the invention consists in providing for the drop doors of a freight car supporting and locking devices comprising a plurality of hooks pivotally mounted on the side of the car body and adapted to swing into supporting engagement with suitable brackets secured to the door and extending beyond the free edge of the latter, in combination with a longitudinally extending shaft provided with means for successively rotating the hooks so as to release the doors one after another, means also being provided whereby the several hooks are locked in door supporting position through the intermediacy of means operating to lock said shaft.

A further feature of the invention consists in providing a door locking mechanism capable of supporting and locking in supported position all the drop doors on one side of a freight car, the said locking mechanism comprising a plurality of brackets rigidly secured to the side sill of the car and adapted to form pivotal supports for a plurality of door supporting hooks as well as to afford bearings for the support of a horizontally extending shaft upon which are mounted a plurality of pairs of fingers corresponding in number to the door supporting hooks, the said fingers being adapted to actuate the hooks so as to cause the latter to engage with or be disengaged from angle-irons or brackets secured to the car doors and being so related that the hooks may be successively released, thereby enabling the doors to be released with a less application of force than would be necessary to release all the doors at one time.

Other objects of the invention and other features of construction residing in particular details of elements and combinations of parts will be hereinafter more fully described and pointed out in the claims.

In the drawings which show a preferred embodiment of the invention,—

Figure 1 is a diagrammatic side elevational view of a freight car having door locking mechanism embodying the invention applied thereto.

Figure 2 is a fragmentary side elevation of the construction shown in Fig. 1 on an enlarged scale.

Figure 3 is a detail side elevation of a portion of the mechanism on a still larger scale, one of the door supporting hooks being shown in locked position.

Figure 4 is a fragmentary cross sectional view showing a portion of the center sill of a car, a portion of a hopper and the relation of the longitudinal shaft to one of the door supporting hooks and the bracket upon which said hook is pivotally mounted.

Figure 5 is a fragmentary end elevation of a portion of the device, showing the handle end of the longitudinal shaft of the locking device and the dog for maintaining the handle in locked position.

Figures 6 and 7 are fragmentary elevational views showing a portion of the longitudinal shaft, its handle and a catch for cooperating with the latter to retain the shaft in locked position, the parts being shown in locked relation in Fig. 6 and in unlocked relation in Fig. 7.

Figures 8, 9 and 10 are detail views of one of the fingers secured to the operating shaft.

The locking device is shown as applied to the doors on one side of the car, but it is to be understood that a similar arrangement is to be employed on the other side.

The freight car 1 which has been chosen for the purpose of illustrating the invention is furnished with drop bottom doors 2 which are hinged along their rear edges (see Fig. 4) to suitable brackets 3 riveted to the center sill 4. Each of these doors is provided with suitable arms or brackets which may conveniently consist of angle irons 5 attached to the bottom of the door and extending outwardly beyond the free edge of the door upon which they are mounted. The car illustrated in the drawings is of the type having a hopper 6, the car floor being indicated at 7 and the sides of the hopper being shown at 8. It will be understood that the car is constructed with a number of these hoppers and that each of them is closed by one of the doors 2.

Rigidly secured to the inner face of the side sill 9 are a plurality of brackets 10 which are respectively provided with bosses 11 forming pivotal supports for door supporting hooks 12. Each of the brackets 10 is preferably also fashioned with a downwardly extending arm 13 in the lower end of which a bearing 14 is provided. Suitably supported in the bearings 14 is a shaft 15 which preferably extends longitudinally of the car throughout the full length of the latter and which may advantageously be either square or rectangular in cross section.

The jaw or supporting ledge of each of the pivoted hooks 12 is adapted to extend under and engage the upper or horizontal leg of the corresponding angle iron 5 carried by the adjacent door, the doors being thus supported in closed position. To provide means for rotating the hooks so as to disengage them from the angle iron door arms 5, and also to enable said hooks to be swung into supporting relation to the angle irons 5 and maintained in such position, the shaft 15 is provided with a plurality of fingers 16. These fingers, which are preferably in the form of clamps embracing the shaft, are arranged in pairs, each hook being arranged between the fingers of a pair.

As shown in Figs. 8, 9 and 10, each of the fingers 16 is formed in two pieces which are held by a bolt 17. The fingers are formed with rectangular or square portions 18 and with a centrally disposed round opening 19, while the shaft 15 is notched at predetermined intervals so as to provide round bearing portions 20 over which the two halves of the fingers 16 are clamped. The square portions 18 of the fingers by receiving and contacting with the correspondingly formed portions of the shaft adjacent the notches prevent the fingers from rotating upon the shaft; and as the entry of portions of the fingers into the notches of the shaft prevents said fingers from sliding lengthwise of the latter, it will be perceived that the fingers are rigidly mounted on the shaft in a simple manner.

The notches 20 in the shaft 15 are so positioned that each of the hooks 12 intervenes between the neighboring pair of the fingers 16, one of said fingers for each hook being adapted to contact the hook with which it is associated when the latter is in supporting engagement with the angle iron door arm 5. By this means the several hooks are prevented from swinging to released position when the shaft 15 is locked against shifting. As is shown in the portions A and B of Fig. 2, each door is preferably sustained in closed position by two hooks. While the several fingers 16 which are located to the rear of the hooks (considering the right hand end as the front of the car) are all designed to simultaneously engage the respective hooks when the latter are in locked position, the fingers 16 which are in front of the hooks are progressively spaced in pairs, so that the fingers in front of the hooks associated with one door are nearer to said hooks than are the corresponding fingers located in front of the hooks of the next door. The lost motion connections between the shaft 15 and the hooks 12 which result from this progressive spacing of the fingers enables the doors to be released successively. Thus, a movement of the shaft 15 to the left will cause the fingers 16 in front of the hooks associated with the portion B of the car to contact their hooks and force them from engagement with the door arm angle irons 5 before the fingers 16 in front of the hooks of the portion A of the car force their hooks from supporting engagement with the angle irons 5 of the adjacent door 2. In other words, the fingers 16 located to the front of the hooks are progressively spaced in pairs throughout the length of the shaft 15, so that a movement of the shaft in a rearward direction will successively actuate the hooks and release the doors dissimultaneously. This is a matter of importance, as much less force is required to open the doors in this manner

than would be necessary if all the doors were simultaneously released. This locking mechanism in no way interferes with the closing of the doors in any desired order, as the doors may simply be swung upward to closed position and the hooks allowed to swing into locking relation with their respective door arms 5. This free swinging movement of the hooks permitting the doors to be swung upwardly and supported in closed position without the necessity of manipulating the shaft 15, is possible because of the spaced relation of the fingers 16 between which the hooks intervene. When it is desired to lock the doors after they have been swung upwardly and supported in closed position by the hooks 12, the shaft 15 is simply pulled forwardly so that the fingers 16 to the rear of the respective hooks force and hold all of the said hooks in locking engagement with the corresponding door arm angle irons carried by the doors 2.

As well shown in Figs. 5, 6 and 7, means are provided for shifting the shaft 15 longitudinally and for locking it in its forward position corresponding to the locked positions of the door supporting hooks 12. The means for actuating the shaft and for locking it are preferably formed by providing the shaft near its end with a notch 21 for receiving a two-piece handle 22 clamped thereon in such manner as to be capable of rotating slightly with respect to the shaft but without capability of longitudinal movement thereon. A catch 23 formed on the end of the car is adapted to stand in front of and engage the handle when the shaft 15 is in its outermost position corresponding to the locked position of the hooks 12, while located above the catch 23 is a pivoted dog or cam 24 adapted to be rotated into engagement with the said handle to prevent the latter from becoming accidentally released from its retaining catch 23. When the doors are to be unlocked the dog 24 will be swung to the position shown in Fig. 7 and the operating handle 22 will be swung upwardly a distance sufficient to clear the catch 23. The shaft 15 may be thereafter caused to execute a rearward longitudinal movement enabling the fingers 16 which are in front of the door supporting hooks to successively disengage said hooks from the angle iron door arms 5 of the doors, thus releasing said doors one after the other. When the hooks have been disengaged from their respective door arms 5, the rod 15 will be moved midway between its extremities of travel so that the handle 22 will rest on the catch lug 23, thus bringing the hook actuating fingers 16 to a position permitting the hooks to be swung as desired in either direction and thereby enabling the doors to be closed in any order desired.

It will be perceived that my invention provides means for releasing one or more of the doors by operations which are easily performed and that the locking of the doors is likewise easily accomplished.

Many slight changes may be made without in any way departing from the spirit and scope of the invention, and I do not wish to be in any way limited to the form of car shown, as the invention may be equally applied to many other forms of cars having drop bottom or similar doors.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a freight car having a plurality of drop bottom doors, hooks pivotally mounted along the side of the car for supporting said doors, a shaft disposed longitudinally of the car body and having fingers thereon so spaced as to act on said hooks successively when said shaft is moved in one direction to force said hooks from a supporting relation with said doors and thereby permit said doors to swing to an open position.

2. In combination with a freight car having a plurality of drop bottom doors, hooks pivotally mounted on the side of the car for supporting said doors, a shaft disposed longitudinally of the car body and having fingers thereon so spaced as to act on said hooks successively when said shaft is moved in one direction to force the said hooks from a supporting relation with said doors and thereby permit said doors to swing to an open position, and further fingers on said shaft for forcing said hooks into locked relation with said doors when said shaft is moved in the opposite direction.

3. In combination with a freight car having a plurality of drop bottom doors, hooks pivotally mounted on the side of the car for supporting said doors, a shaft disposed longitudinally of the car body and having fingers thereon so spaced as to act on said hooks successively when said shaft is moved in one direction to force the said hooks from a supporting relation with said doors and thereby permit said doors to swing to an open position, further fingers on said shaft for forcing said hooks into locked relation with said doors when said shaft is moved in the opposite direction, and means for holding the shaft in its locked relation with the doors.

4. In combination with a freight car having a plurality of drop bottom doors, brackets mounted along the car body, hooks pivotally mounted on said brackets for supporting said doors, bearings formed on said brackets, and a shaft disposed longitudinally of the car body and supported by said bearings, said shaft having fingers thereon so spaced as to act on said hooks successively when said shaft is moved in one direction to force said hooks from a supporting relation

with said doors to thereby permit said doors to swing to an open position.

5. In combination with a freight car having a plurality of drop bottom doors, hooks pivotally mounted on the side of the car for supporting said doors, a shaft disposed longitudinally of the car body having fingers so spaced as to act on said hooks successively when said shaft is moved in one direction to force the said hooks from a supporting relation with said doors and thereby permit said doors to swing to an open position, and further fingers on said shaft for forcing said hooks into locked relation with said doors when said shaft is moved in the opposite direction.

6. In combination with a freight car having a plurality of drop bottom doors, hooks pivotally mounted on the side of the car for supporting said doors, a shaft disposed longitudinally of the car body, clamping fingers on said shaft so disposed as to successively act on said hooks when said shaft is moved in one direction to force said hooks from supporting relation with said doors and permit said doors to swing successively to an open position, further fingers clamped on said shaft for forcing said hooks into locked relation with said doors when said shaft is moved in the opposite direction, and means for locking the shaft against longitudinal movement.

7. In combination with a freight car having a plurality of drop bottom doors, hooks pivotally mounted on the side of the car for supporting said doors, a shaft disposed longitudinally of the car body and having a plurality of notches formed therein, fingers on said shaft extending into said notches, said notched portions and said fingers being so disposed along said shaft as to cause said fingers to successively act on said hooks when said shaft is moved in one direction to force said hooks from supporting relation with said doors and permit said doors to swing to an open position, further notches on said shaft and fingers clamped in said last named notches for forcing said hooks into locked relation with said doors when said shaft is moved in the opposite direction, and means for locking said shaft against longitudinal movement.

8. In combination with a freight car having a plurality of drop bottom doors, brackets mounted on the side of the car, hooks pivotally mounted on said brackets, means secured to the doors adapted to be engaged by said hooks to thereby support the doors, each of said brackets being provided with a bearing, a shaft disposed longitudinally of the car body and supported in said bearings, means located on said shaft to act on said hooks when said shaft is moved in one direction to force said hooks from a supporting relation with said means formed on said doors, to thereby permit said doors to swing to an open position, further means located on said shaft for forcing said hooks into locked relation with the means formed on said doors to thereby lock the doors in a closed position when said shaft is moved in the opposite direction and means for locking the shaft against longitudinal movement.

9. In combination with a freight car having a plurality of drop bottom doors, hooks pivotally secured to the side of the car for supporting said doors, a shaft disposed longitudinally of the car body and having means thereon spaced so as to operate on the front and rear edges of said hooks according to the direction of the movement of the shaft to thereby release the hooks from door supporting relation with said doors when the shaft is moved in one direction to allow the doors to open and to force the hooks into engagement with said doors to thereby lock them in their closed position when the shaft is moved in the opposite direction, means secured to the end of the shaft for moving said shaft in a forward or rearward direction, and means for locking the latter means.

10. In combination with a freight car having a plurality of drop bottom doors, brackets secured to the side of the car body, angle irons secured to the bottoms of the car doors, hooks pivotally mounted on said brackets and respectively engaging an angle iron, said brackets being provided with depending bearings, a shaft located longitudinally of the car body and supported in said bearings, clamping fingers located on said shaft and held against movement relative to said shaft, the said clamping fingers being so disposed that there will be one to the front and one to the rear of each of said hooks, certain of said fingers being adapted to release said hooks from engagement with said angle irons when said shaft is moved in one direction and other of said fingers serving to hold said hooks in engagement with said angle irons when said shaft is moved in the opposite direction, a rotatable handle clamped near the end of said shaft and arranged to be held against longitudinal movement in relation to said shaft, and means for locking said handle against rotation when the shaft and fingers are in their locking position to thereby lock all of the doors in their closed and supported position.

11. In combination with a freight car having a plurality of swinging doors, individual door-supporting means pivotally secured to the car body and capable of individual operation to supporting or releasing position independently of each other, and means cooperating with all of the door-supporting means for successively releasing all of the doors.

12. In combination with a freight car hav-

ing a plurality of swinging doors, individual door-supporting means pivotally secured to the car body and capable of movement independently of each other, and slidable means normally having a lost motion connection with all of the door-supporting means for locking all the latter in door-supporting position when said means is moved in one direction and for successively releasing the doors when said means is moved in the opposite direction.

13. In combination with a freight car having a plurality of swinging doors, individual door-supporting means operatively interposed between each door and the car, a slidable member extending along the car and connecting all of the said door-supporting means, said member being operable to effect release of all of the door-supporting means, the said connecting member having a preliminary movement sufficient to permit of the independent release of the door-supporting means for individual doors before actuating the said door-supporting means.

14. In combination with a freight car having a plurality of drop bottom doors, a plurality of hooks pivotally mounted on the car body for supporting said doors in closed position, and means for swinging each of said hooks to door releasing position and to locked position, said means comprising simultaneously movable members respectively adapted to engage opposite sides of an adjacent one of said hooks and constituting a lost motion connection therewith.

15. In combination with a freight car having a drop bottom door, a plurality of brackets rigidly mounted on the car body, a plurality of hooks pivotally mounted on the respective brackets and adapted to support said door in closed position, a plurality of means respectively adapted to engage said hooks to swing the latter to door releasing position, a plurality of means for engaging the respective hooks to maintain the latter in locked position, and means for causing said last named means to be disengaged from said hooks when said first named means are caused to engage said hooks.

16. In combination with a freight car having a drop bottom door, a plurality of pivoted hooks for supporting said door in closed position, movable means engagable with and disengageable from the respective hooks for preventing the latter from swinging to unlocked position, and means for simultaneously actuating said movable means to permit said hooks to execute door releasing movements.

17. In combination with a car having a plurality of swinging doors, pivoted hooks operatively interposed between said doors and the car body for supporting said doors in closed position, and mechanism for rotating said pivoted hooks, said mechanism being adapted in a single operation to rotate a plurality of said hooks so as to release a plurality of doors successively.

18. In combination with a freight car having a plurality of swinging doors, a plurality of pivotally supported latching members therefor, and movable means carried by the car body having portions for respectively engaging each of said latching members below the pivot thereof for forcing said members into final door supporting position, said means being movable in the direction of swing of said latching members.

19. In combination, a plurality of dump doors, a latch for each door, means for directly holding said latches in latching position, means operable in one movement for simultaneously locking said latch holding means and in movement in another direction to move said latch holding means in predetermined succession to non-holding position.

In testimony whereof I affix my signature.

WILLIAM E. WINE.