

Oct. 16, 1923.

F. EDER

1,471,111

AUTOMATICALLY LOCKING FLAT CAR FOR CONTAINERS

Filed Nov. 10, 1921

9 Sheets-Sheet 1

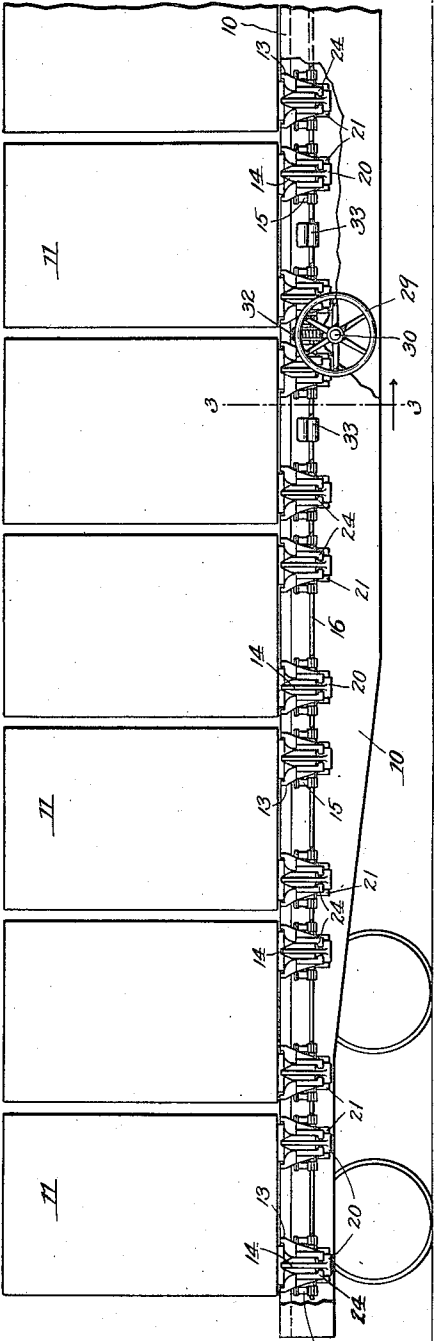


Fig. 1.

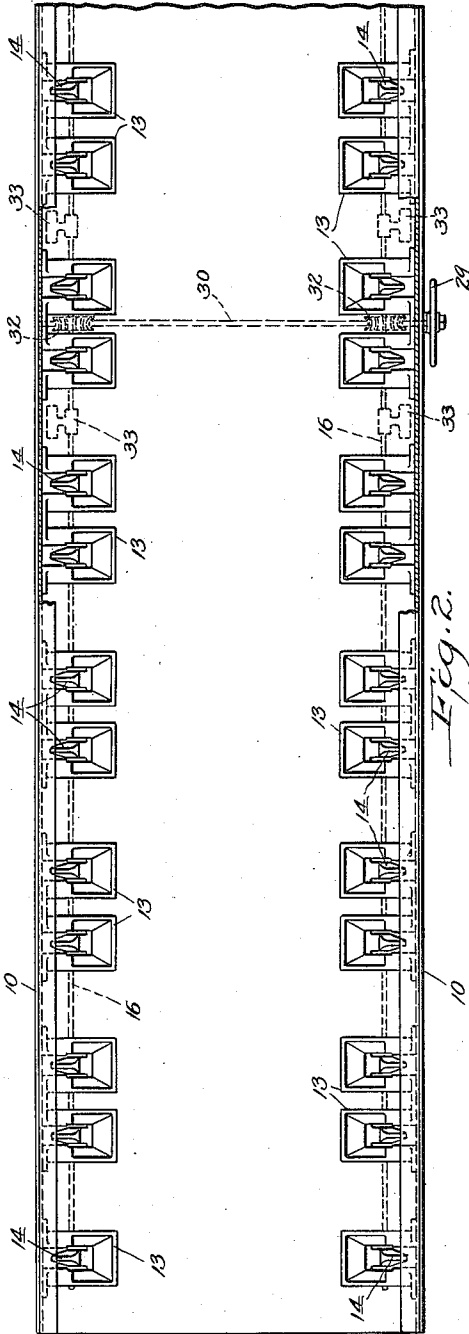


Fig. 2.

WITNESSES

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BY Knight Bros
ATTORNEYS

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Fig. 3.

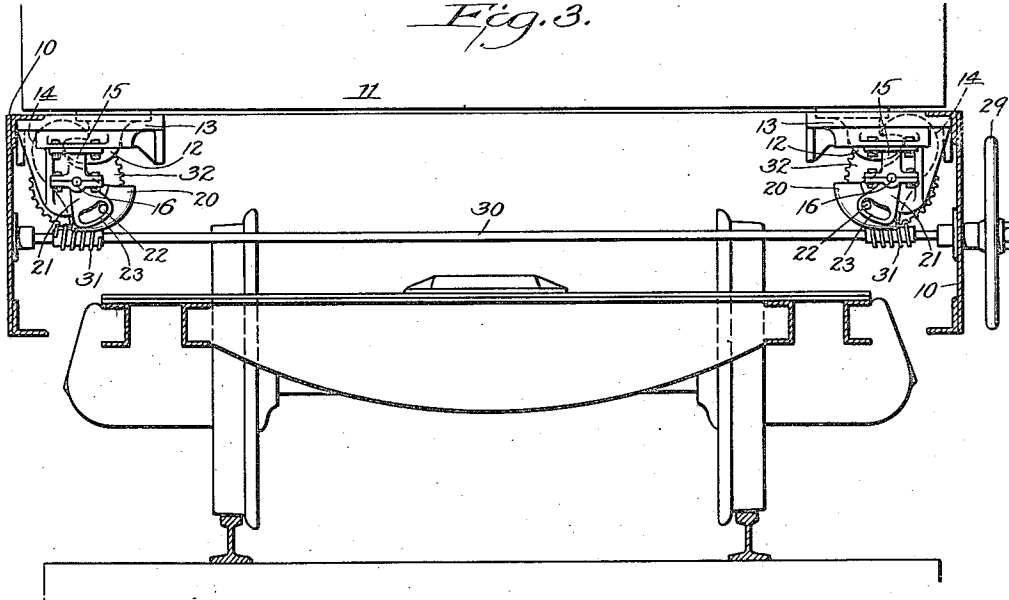
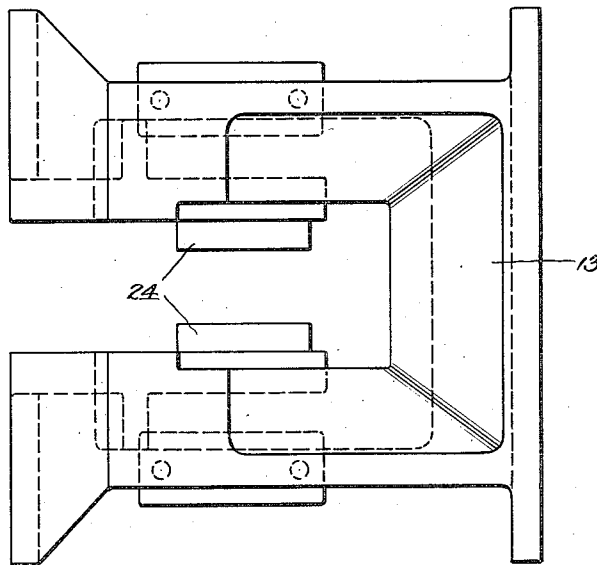


Fig. 4.



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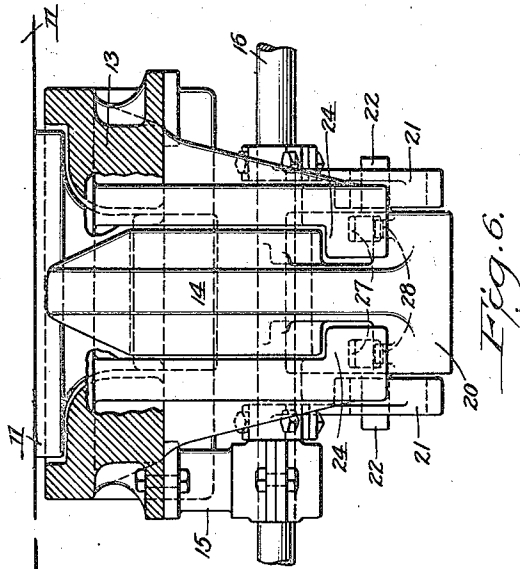


Fig. 6.

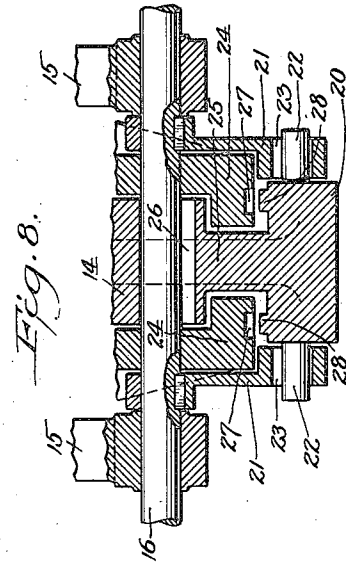


Fig. 8.

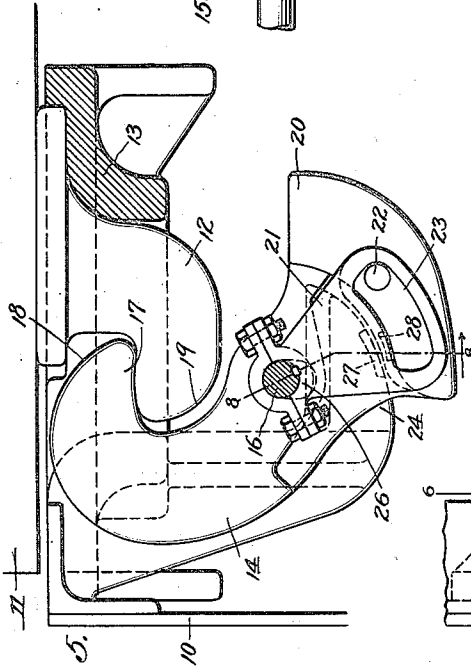


Fig. 5.

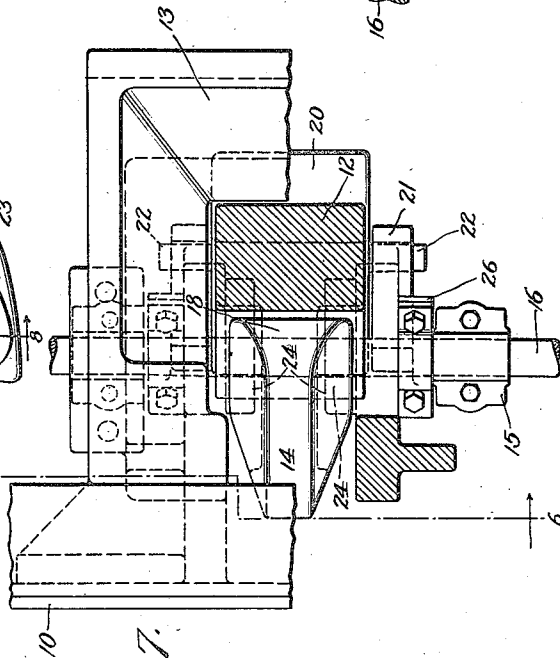


Fig. 7.

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Fig. 9.

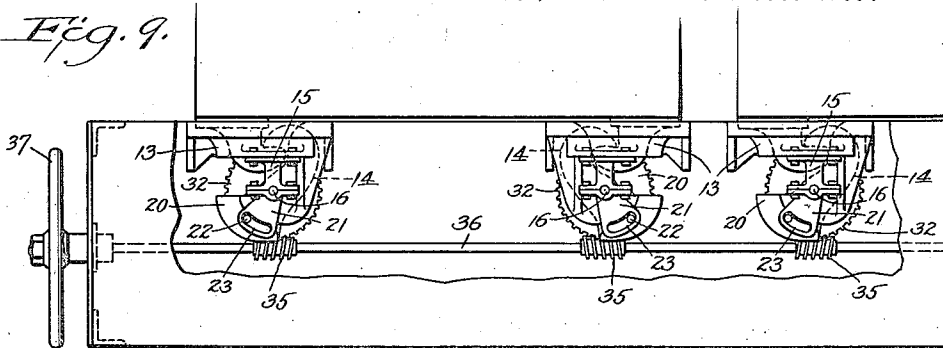
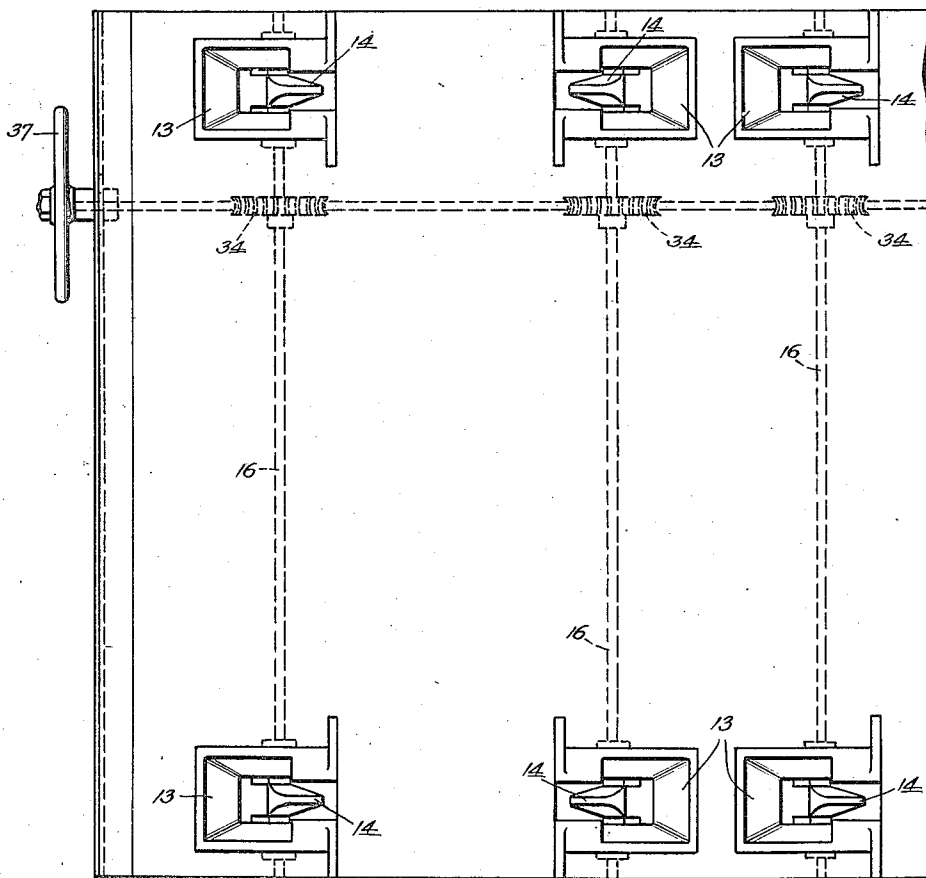


Fig. 10.



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Fig. 11.

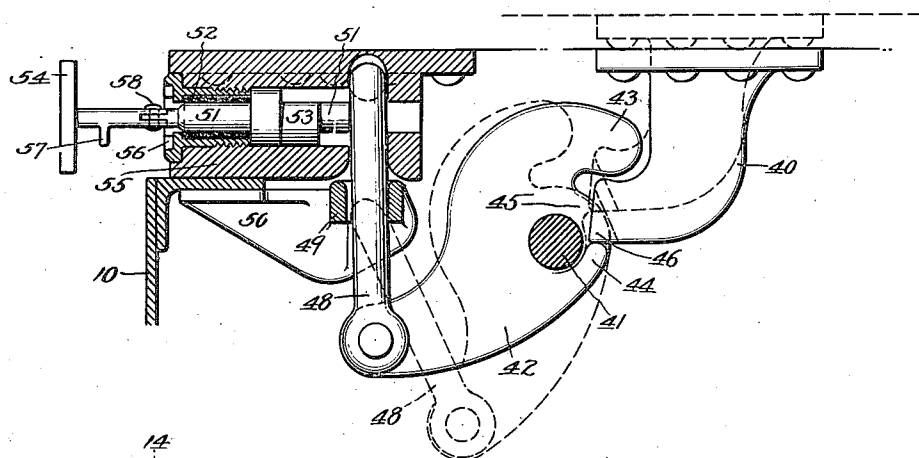


Fig. 12.

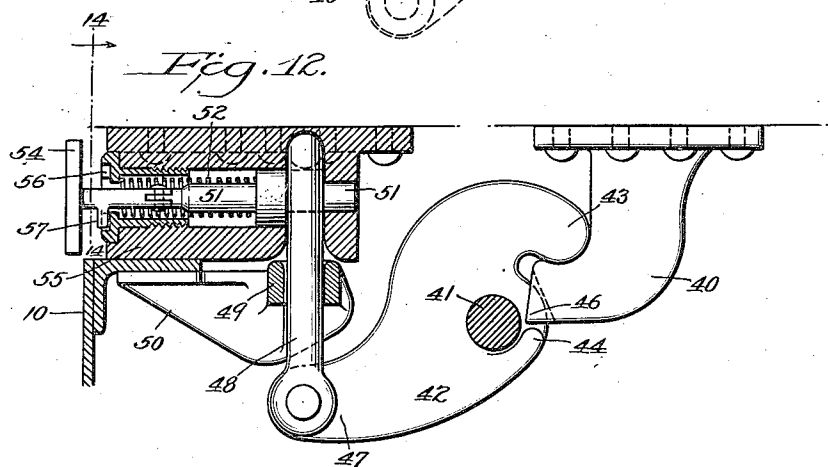
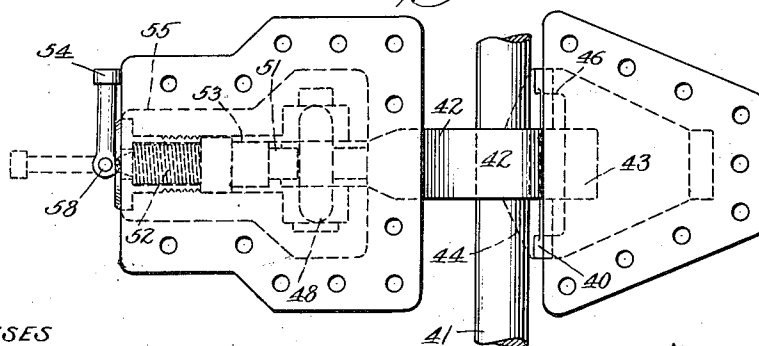


Fig. 13.



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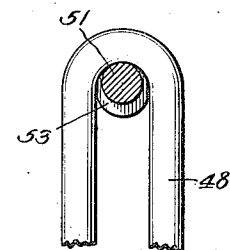
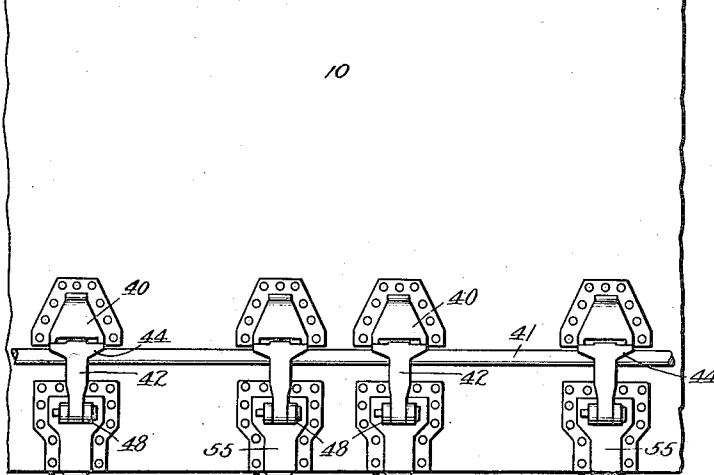
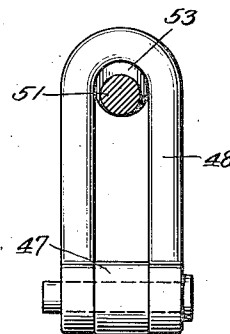
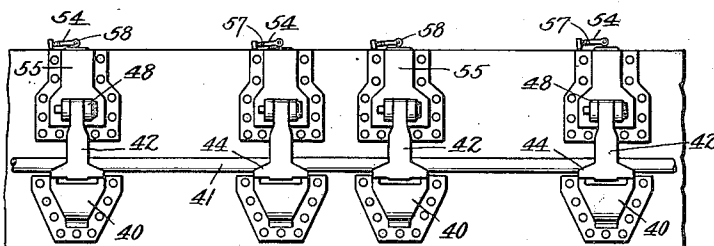
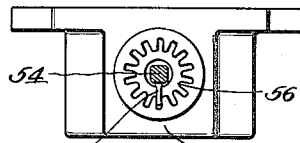
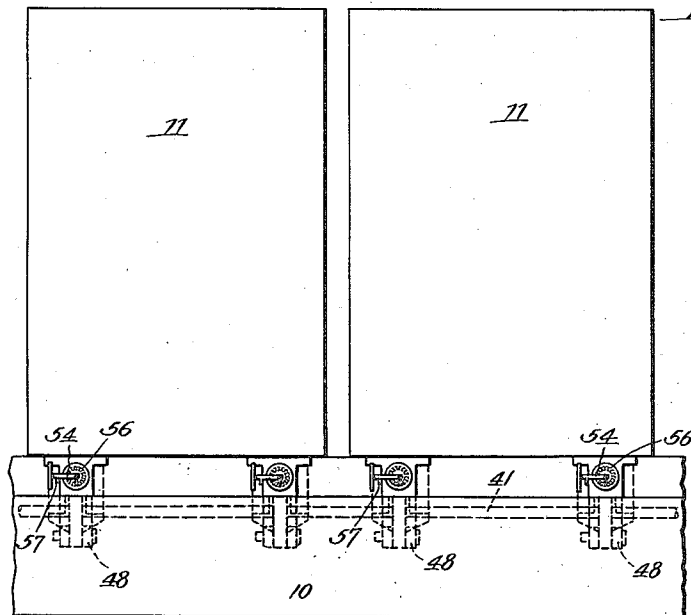
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Fig. 18.

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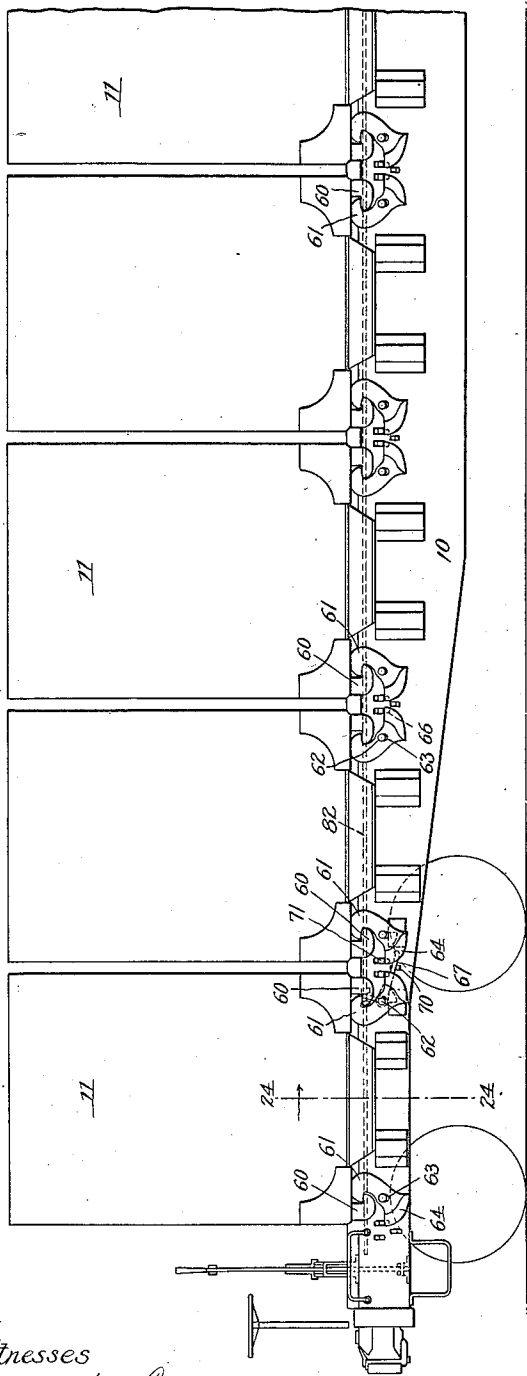
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Fig. 19.



Witnesses
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By his Attorneys

Fig. 21.

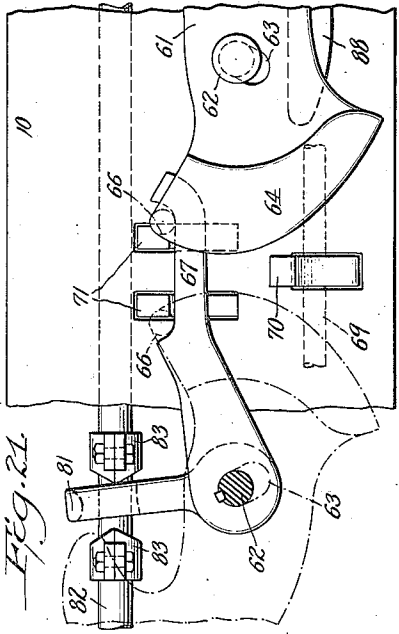
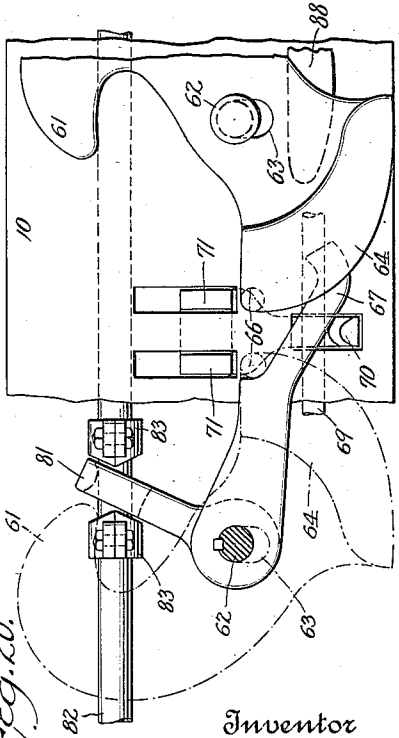


Fig. 20.



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Fig. 22.

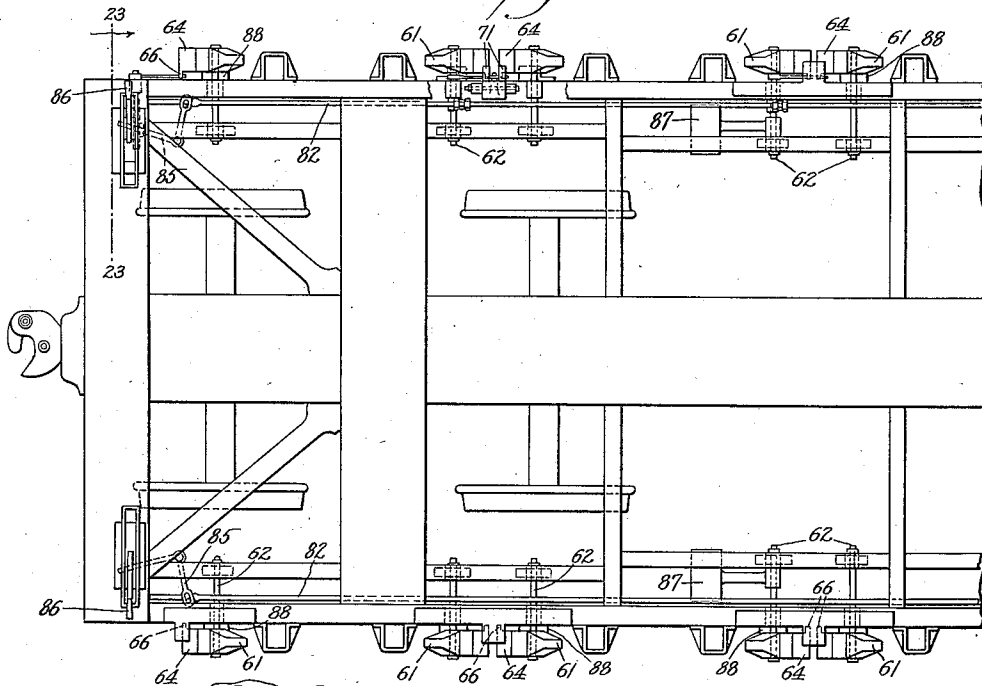
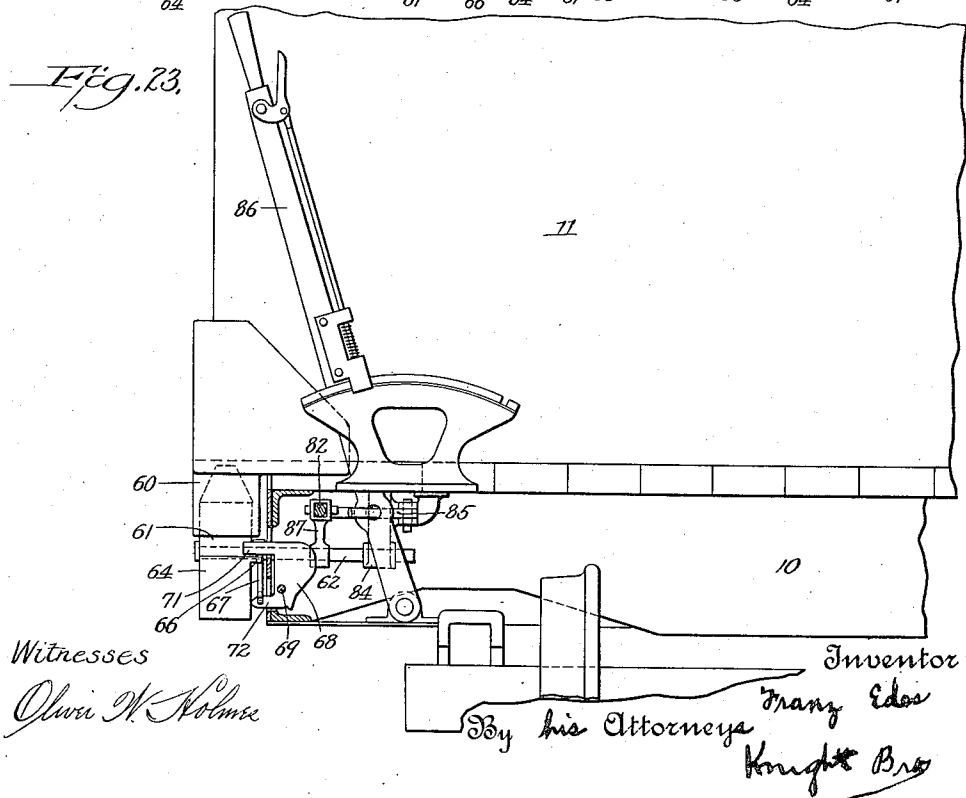


Fig. 23.



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Fig. 24.

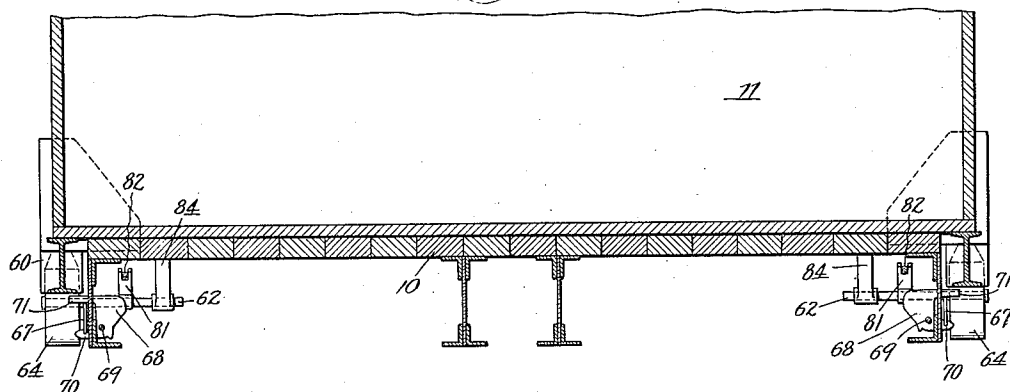


Fig. 25.

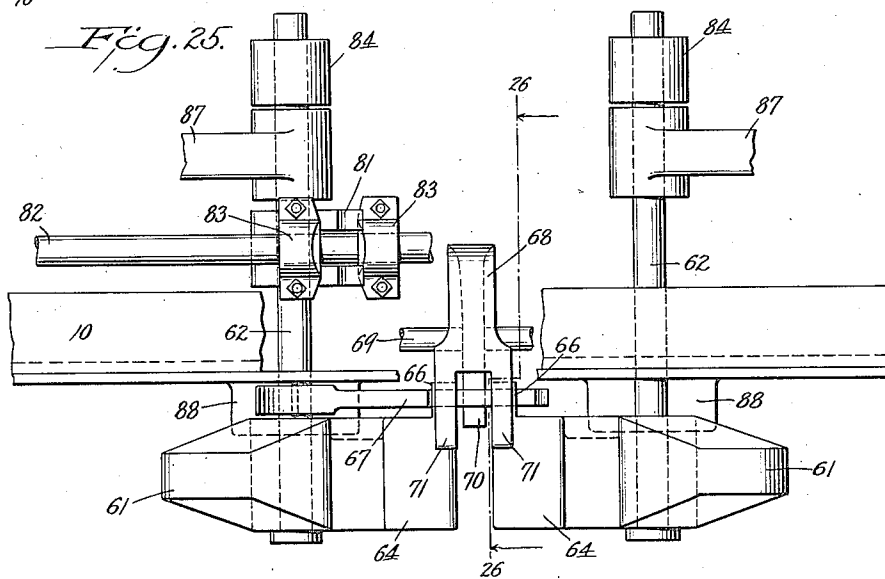
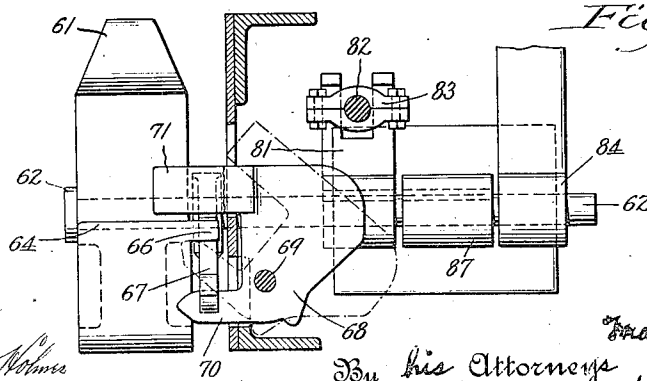


Fig. 26.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANZ EDER, OF NEW ROCHELLE, NEW YORK, ASSIGNOR TO RIVER AND RAIL TRANSPORTATION COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF OKLAHOMA.

AUTOMATICALLY-LOCKING FLAT CAR FOR CONTAINERS.

Application filed November 10, 1921. Serial No. 514,309.

To all whom it may concern:

Be it known that I, FRANZ EDER, a citizen of the United States, and resident of New Rochelle, county of Westchester, and State of New York, have invented certain new and useful Improvements in Automatically-Locking Flat Cars for Containers, of which the following is a complete specification, the particular novel features being more fully pointed out in the annexed claims.

My invention relates to the fastening and automatically locking of unit containers to the platforms of carriers such as for instance railroad cars, trucks or the like and it constitutes an improvement on the type of unit carrier cars such as for instance illustrated and described in the United States patent to H. W. Kirchner No. 1,252,810 of January 8th, 1918.

My improvement relates in particular to the type of lock employed by which the unit in being placed on the car or carrier will automatically lock itself to its supporting platform, means being provided by which subsequent to this locking operation the locks of all units on the car may be jointly secured, and by which through the same means the locks of all containers may be jointly removed when it is desired to lift the containers from the carrier.

My invention is illustrated in the accompanying drawings, in which:—

Figure 1 represents a side elevation of one of the modifications,

Figure 2 represents a top plan view thereof,

Figure 3 represents a transverse vertical section on the line 3—3 of Figure 1,

Figure 4 represents a plan view of the pocket casting of an individual lock,

Figure 5 represents an enlarged side view of a locking hook,

Figure 6 represents a front view thereof on line 6—6 of Figure 7,

Figure 7 represents a plan view of a locking hook partly broken away and partly in section,

Figure 8 represents a vertical section through the hook on line 8—8 of Figure 5,

Figure 9 represents a side elevation of a different arrangement of the locks relative to the sides of the carrier,

Figure 10 represents a top plan view thereof,

Figure 11 represents a side view, partly in section, of a different form of lock,

Figure 12 represents the same side view in complete locked position,

Figure 13 represents a top plan view thereof,

Figure 14 represents the front view of the securing member,

Figures 15 and 16 represent two different positions of cams and hooks controlled by the securing member,

Figure 17 represents the side elevation of a platform portion showing the arrangement of the locking and securing members,

Figure 18 represents an inverted plan view thereof,

Figure 19 represents a side elevation of a railroad car portion showing a third modified form of container locks,

Figure 20 represents an enlarged view of the locking hooks in locking or closed position,

Figure 21 represents a similar view showing the hooks in open position,

Figure 22 represents a plan view of the form shown in Figure 19,

Figure 23 represents an end elevation of a car portion shown in Figure 22 in the direction of the arrow on line 23 in Figure 22,

Figure 24 represents a transverse vertical section through the car platform on line 24 of Figure 19,

Figure 25 represents a plan view of the hook details shown in Figure 20, and

Figure 26 represents a transverse section taken on the line 26 in Figure 25.

Referring to the modification illustrated in Figs. 1 to 8, the carrier, in this case a flat railroad car, is shown at 10, and the containers carried by the car and to be locked thereto by the improved locks, are shown at 11. In this particular modification, the containers are of sufficient length to extend entirely across the width of the car so that the locking devices which are applied to the feet of the container are arranged in longitudinal rows along each side of the carrier or the car.

The particular form of hook and locking means characteristic of this modification are shown in Figs. 5 to 8 in detail. In Fig. 5 the form of one of the container feet 12 is shown together with a small portion of the corner of container 11. For the purpose of

accommodating the container feet 12 the platform is provided with a number of pockets 13 (see also Fig. 2) one for each container foot, into which the feet recede, so that the container substantially rests on the platform of the carrier. Each foot is well rounded off and also the pockets are provided with sufficient flare so that when the container is lowered on the car each foot will easily find its seat whereby the container is automatically located in the proper position on the carrier so as to insure the correct locking of each foot. The pocket 13 is shown in detail in the plan view in Fig. 4. As will be noted from that figure this pocket is substantially U-shaped, such that between its two shanks a locking hook 14 may be arranged in the manner shown in Figs. 5 to 8. For this purpose two hangers 15 are provided at the under side of the pocket casting in which a shaft 16 is journaled which serves as an axle on which hook 14 may freely swing. The nose 17 of hook 14 is suitably shaped so that it will easily engage the upper portion of container foot 12 when in the position shown in Fig. 5. The lower portion of hook 14 is considerably enlarged and forms a counter weight 20 to the upper hook portion, of sufficient size so that the hook 14 always tends to remain in the position relative to the pocket shown in Fig. 5. The transverse section of the lower hook portion, in particular the weight 20 may be seen from Fig. 8. The upward portion of nose 17 as shown at 18 and the lower end portion of foot 12 as shown at 19 are shaped such that when the container foot 12 enters pocket 13, the foot portion 19 engages first nose portion 18 of the hook, thereby gradually pushing the hook to the left so that the container foot can freely enter its pocket. After the foot is properly seated in the pocket nose 17, through the action of counter weight 20, will slip over the upper portion of foot 12 and assume the position shown in Fig. 5, in which the foot is locked to the pocket.

In order to secure hook 14 in locking position I have provided the following means. On each side of the lower end of hook 14, adjacent to weight 20 is provided a sector 21 which is keyed to shaft 16. On each side of weight 20 is provided a pin 22 which passes through a slot 23 provided in the adjacent sector 21, slots 23 being of sufficient peripheral length to allow hook 14 to yield when foot 12 enters the pocket in the manner described before. However, if shaft 16 is rocked into such a position that the sectors 21 are swung into the position shown in Fig. 5, hook 14 is prevented from moving off foot 12 on account of pins 22 abutting against the ends of slots 23. If on the other hand shaft 16 is rocked in the opposite di-

rection to a certain angle pins 22 will be engaged by the other ends of slots 23 and on further rocking of shaft 16 in the same direction hook 14 will be swung clear of foot 12, so that the container may be lifted out of its pocket.

Before the operation of rocking shaft 16 is described, reference will first be made to the means by which the strain may be taken off shaft 16 when the hook has engaged the container foot, in case the entire container should by accident (for instance in case of impact against the car) tilt and tend to lift its feet out of their pockets. Such strain would ordinarily be imparted through the hook to shaft 16 which for this purpose would have to be dimensioned unduly large. In order to prevent those strains on shaft 16 I provide the pocket 13 with two downward extensions 24 disposed laterally of the lower portion 25 of hook 14 which for this purpose is made thinner so that these extensions 24, which shall hereinafter be termed "lift stops," surround the hub of the hook as shown in Fig. 8. The lift stops 24 may also be seen in Figs. 4, 5 6, and 7. Counter weight 20 is of sufficient axial width so as to overlap the two lift stops 24. Moreover the hub boring by which hook 14 is suspended on rocking shaft 16 is oblong as shown at 26 in Figs. 5 and 8. Thus when the foot 12 exerts a strain on hook 14 which tends to lift the hook upward, the upper face of counter weight 20 will engage the lower face of lift stop 24 before the hook can exert an upward strain on rocking shaft 16. In order to prevent in case of such engagement of weight 20 with lift stops 24, the unlocking of hook 14, lift stops 24 are provided each with a recessed portion 27 with which engage bosses 28 provided on the upper face of counter weight 20. This will prevent weight 20 from sliding on the rounded surface of lift stop 24 and maintain the hook in locked position.

For the purpose of operating the individual locks of all container feet, described hereinbefore, simultaneously I extend in the modification shown in Figs. 1 to 8 rocking shafts 16 alongside of the two sides of the car as shown for instance in Figs. 1 and 2 by which thus the locks on each side are connected together. These two rocking shafts 16 then may be operated by any suitable means, for instance by means of a hand wheel 29 provided at one side of the car by which a transverse shaft 30 (see Figs. 2 and 3) may be operated. The shaft in this modification is provided with two worms 31 each of which engages a worm wheel 32 carried by the corresponding shaft 16. By turning hand wheel 29 to the left or right the hooks may be either secured in locking position or lifted off the container feet as described before.

In order to avoid unnecessary exertion of force in operating hand wheel 29, which of course, must overcome the weight of counter weights 20 and also of sectors 21 when the hooks are lifted off feet 12, I provide several counter weights 33 on each shaft 16 which balance the weights to be lifted to a certain extent so that the operation of hand wheel 29 is made considerably easier.

Instead of arranging the pockets in the manner shown in Figs. 1 and 2 along the two longitudinal sides of the car, they may be also arranged such that always two transversely oppositely located operating devices are journaled together by their rocking shafts 16, the assumption being in this case that otherwise the construction of the particular locking device is the same as described hereinbefore. This modification is shown in Fig. 10 in which the pockets are again indicated at 13, the hooks at 14 and rocking shafts at 16. Each rocking shaft connects two transversely oppositely disposed pockets 13, and each shaft is provided with a worm wheel 34 which engages correspondingly with a worm 35 mounted on shaft 36 running longitudinally of the car and operated by a hand wheel 37 provided at the end of the car, or if desired one wheel at each end.

A different form of hook and operation thereof for locking the container feet to the car is shown in Figs. 11 to 18. Referring to Figs. 11 and 12 which show the lock of an individual foot, the container foot is indicated at 40. An axle 41 suitably secured to the frame of the car (not shown) carries pivoted thereon a hook 42 substantially of the form shown. In this case the weight of the hook is distributed so that the nose 43 of the hook normally tends to stay clear of the path of foot 40 so that the latter may enter freely through the platform of the car (not shown). The normal position which hook 42 tends to assume is shown in dotted lines in Fig. 11 and also foot 40 is shown in dotted lines in the stage of entering through the car floor and before it is entirely seated. In order to automatically engage hook 42 with foot 40 when the latter is properly in place on the car I have provided on hook 42 adjacent to its pivotal axis two lateral detents 44 one of which may be seen in Figs. 11 and 12. The end of foot 40 is suitably recessed to allow it to pass the hub portion 45 of hook 42 when it is lowered but the remainder of the foot end 46 will engage the two lateral detents 44 of the hook thereby forcing the hook from the position shown in dotted lines in Fig. 11 into the full line position when the foot is properly seated as shown in full lines in that figure. In this full line position nose 43 has swung over the upper portion of foot 40.

The rear end 47 of hook 42 has pivotally

attached to it a yoke 48 the upper end of which is guided in a pocket 49 formed in a casting 50 attached to the car frame 10. From Figs. 11 and 12 it will be seen that when hook 42 swings from the dotted into the full position the yoke 48 slides up in its pocket 49.

As soon as yoke 48 has assumed the position shown in full lines in Fig. 11 its upper end has entered the portion of the locking casting in which a transverse spring operated shaft 51 is disposed. This shaft may be held in the position shown in Fig. 11, by throwing handle 54, hinged to it at 58, at right angles to it (not shown). If now this handle is straightened out into the position shown in this figure, shaft 51 is thrown to the right by the pressure of spring 52 and enters the yoke, and with it enters a cam 53 provided on shaft 51. This cam is shown in Fig. 15 in the position in which it appears in Fig. 11. If now shaft 51 is rotated 180° by means of handle 54, cam 53 is thrown into the position shown in Fig. 16, whereby yoke 48 has been lifted into the position shown in Fig. 12. Thus the yoke is locked in place and with it hook 42 so that the container foot 40 is locked in place. This cam operation is desirable for the following reasons: When container foot 40 swings hook 42 in place as shown in full lines in Fig. 11 it would be very difficult to exactly dimension the shape and positions of the two cooperating elements, the foot and the nose 43 of the hook such that the nose 43 would come into firm engagement with the upper portion of foot 40. In order to facilitate the operation of hook 42 by foot 40 it is rather desirable to provide a certain amount of play, which is indicated by the distance between nose 43 and the upper portion of foot 40 shown in Fig. 11. This amount of back lash is taken up by lifting yoke 48 from the position shown in Fig. 11 into that shown in Fig. 12 by means of cam 53 previously described. When this lifting operation is completed, nose 43 has completely engaged the upper portion of foot 40 as shown in Fig. 12.

It may not be possible on account of the more or less rough contours which that class of railroad equipment has of necessity to entirely swing cam 53 the full 180°, but it will frequently appear that nose 43 has fully engaged foot 40 before cam 53 has been turned that far. Thus in order to permit the locking of cam 53 in intermediate positions I have provided at the outer end of casing 55 which contains shaft 51, a star shaped recess 56 shown in full view in Fig. 14. Handle 54 is provided with a detent 57 which falls into one of the notches of recess 56 when shaft 51 moves to the right. Thus cam 53 may be locked in place

against rotation in any suitable position permitted by the star shaped recess 56. It is preferable that handle 54 is linked to shaft 51 as shown at 58 so that the shaft 5 may be held in the position shown in Fig. 11 by swinging handle 54 transversely to shaft 51 as shown in Fig. 13. This is done during the time when yoke 48 enters the guide pocket 49.

10 As shown in Fig. 18 all the hooks 42 for holding the several container feet may be pivotally attached to one common axle 41 which may run longitudinally of the car and be suitably attached thereto (not shown).

In this modification, of course, each container foot must be secured individually in contra-distinction to the modification previously described, in which the securing of the hooks in locking position is done simultaneously from a central point.

A third modification is shown in Figs. 19 to 26. The car is again indicated in Fig. 19 at 10 and the containers at 11. In this case it is assumed that the containers 11 are long enough so that the feet 60 straddle the longitudinal sides of the car. Therefore, instead of providing the hooks locking the feet, underneath the car, they are provided along its two sides. The details of such an arrangement are shown in Figs. 19, 20 and 21. In this case, two adjoining hooks 61 are controlled by a common operating device. Each hook is pivotally suspended on the rocking shaft 62 in an oblong boring 63 to be referred to later on. Each hook is provided at its lower portion with a counter weight 64 which tends to keep the hook in engaging position shown in Figs. 19 and 20. The noses of these hooks and the feet 60 with which they engage are shaped similarly to the form shown in Fig. 5 so that when the container is lowered onto the car each foot will push its hook aside, whereupon as soon as the foot is in position the hook will fall over the foot and lock it in position. In order to remove hooks 61 from their respective feet I have provided for each adjacent pair of hooks such as shown in Figs. 19 to 21 a common arm 67 keyed to shaft 62 on which one of the hooks 61 is suspended. The lower end of each hook is provided with a detent 66 protruding from the hook towards the car. Arm 67 is disposed in the path of these detents so that when arm 67 is swung from the position shown in Fig. 20 into the position in Fig. 21, detents 66 are engaged thereby and hooks 61 are thrown out of engagement with their respective feet. In order to secure the hooks in locking position a U-shaped hook lock 68 is pivoted at 69 adjacent to each pair of hooks and operating transversely to the plane of the hooks as shown in Fig. 26. The lower shank 70 of hook lock 68 is disposed in

the path of arm 67 so that when this arm is in the position shown in Fig. 20 it has depressed shank 70 and thus thrown lock 68 into the position shown in full lines in Fig. 26 in which its two upper shanks 71, one shank for each hook, are thrown into the path of the upper edge of counter weights 64 as shown in Figs. 25 and 26 which prevents the hooks from disengaging from their respective feet. If on the other hand arm 67 is thrown into the position shown in Fig. 21, this arm then becomes disengaged from shank 70 and as a consequence hook lock 68 by its own weight falls back into the position shown in dotted lines in Fig. 26, thus clearing the upward path for the counter weights 64 of the hooks, which are lifted upwardly by arm 67 engaging detents 66 which are taken along and thrown into the position shown in Fig. 21. Shaft 62 to which arm 67 is keyed as mentioned before is journaled underneath the car as shown in larger scale for instance at 84 in Fig. 25. This rocking shaft carries near the inside of the car rim a forked arm 81 within the fork of which a shifting bar 82 is disposed which runs along each side of the car underneath the floor so that it becomes common to all forked levers 81 located on that side. For each fork 81 two shackles 83 are provided on shift bar 82, such that, as shown in Figs. 20 and 21 these shackles throw arm 81 to one or the other side when bar 82 is shifted axially in one or the other direction. In Fig. 20 bar 82 has been shifted to the right and thereby arm 67 is thrown downward for the purpose explained hereinbefore and in Fig. 21 bar 82 has been shifted to the left and thereby arm 81 has been thrown in such position as to lift arm 67 for the purpose also described before.

Shifting bar 82 may be operated in any suitable manner. For instance as shown in Figs. 22 and 23 this bar may be connected to a bell crank 85 suitably pivoted on the car frame, one arm of which is linked to bar 82 and the other arm of which is operatively connected with a hand lever 86. One of these hand levers is provided for each side of the car so that by this lever all hooks located on that side may be simultaneously engaged and locked and simultaneously unlocked and disengaged.

In order to lessen the load which would have to be lifted by hand lever 86, which involves the lifting of all counter weights 64 on that side of the car, a compensation weight 87 may be provided on one or several of the rocking shafts 62 on each side of the car which tends to counterbalance the weight which has to be lifted by lever 86 in unlocking the hooks.

It may be desirable, the same as in the modification shown in detail in Figs. 5 to 8, to take the strain which may be exerted by

the tilting of container 11 off shafts 62, so that these rocking shafts merely serve as the carriers of the weight of their respective hook only. This object is accomplished similarly to the manner shown in Figs. 5, 6, and 8 by making the boring in each hook through which its respective rocking shaft 62 passes, oblong as shown at 63 in Fig. 20. The counter weight 64 of each hook is narrow between its periphery and the hub of the hook so that the inner portion of the counter weight 64, facing the car side may accommodate lift stop 88, which is fastened to the side of the car as shown in Fig. 20. This stop follows substantially the contour of the inner portion of counter weight 64 but is a slight distance spaced apart therefrom as shown in dotted lines in Fig. 20 with the result that in case hook 61 should receive an upward strain by the tilting of the container the counter weight 64 will engage lift stop 88 before the strain is transmitted on to rocking shaft 62.

I claim:—

1. In a carrier of the character described having a carrier member and a container member to be locked to said carrier member, the combination of a pivoted hook and a keeper each attached to one of said members, said hook tending to remain in a definite normal position, and means on said keeper for causing said hook to engage said keeper when the container is placed on said carrier.

2. In a carrier of the character described having a carrier member and a container member to be locked to said carrier member, the combination of a pivoted hook and a keeper each attached to one of said members, said hook tending to remain in a definite normal position, and means on said keeper for causing said hook to engage said keeper when the container is placed on said carrier, and means for locking said hook in engaging position.

3. In a carrier of the character described having a carrier member and a container member to be locked to said carrier member, the combination of a pivoted hook and a keeper each attached to one of said members, said hook tending to remain in a definite normal position, and means on said keeper for causing said hook to engage said keeper when the container is placed on said carrier, and means adapted to lock said hook in engaging position and to cause the disengagement of said hook from said keeper.

4. In a carrier of the character described having a carrier member and a container member to be locked to said carrier member, the combination of a pivoted hook on said carrier member and a foot on said container member adapted to suitably engage with the carrier member to prevent the lateral shifting of the container thereon and simultane-

ously forming the keeper for said hook, said hook tending to remain in a definite normal position, said keeper being suitably shaped to cause said hook to engage said keeper when the container is placed on said carrier.

5. In a carrier of the character described having a carrier member and a container member to be locked to said carrier member, the combination of a pivoted hook on said carrier member and a foot on said container member adapted to suitably engage with the carrier member to prevent the lateral shifting of the container thereon and simultaneously forming the keeper for said hook, said hook tending to remain in a definite normal position, said keeper being suitably shaped to cause said hook to engage said keeper when the container is placed on said carrier, and means adapted to lock said hook in engaging position and to cause the disengagement of said hook from said keeper.

6. In a carrier of the character described having a carrier member and a container member to be locked thereto the combination of a pivoted hook on said carrier member, suitably balanced to normally remain in engaging position, a foot on said container member adapted to act as keeper for said hook, said keeper and hook having suitable shape to cause the keeper to displace the hook from normal position while the container is being located on said carrier member, but to permit the hook to return to normal position and to automatically engage the keeper when the container is in position.

7. In a carrier of the character described having a carrier member and a container member to be locked thereto, the combination of a pivoted hook on said carrier member, suitably balanced to normally remain in engaging position, a foot on said container member adapted to act as keeper for said hook, said keeper and hook having suitable shape to cause the keeper to displace the hook from normal position while the container is being located on said carrier member, but to permit the hook to return to normal position and to automatically engage the keeper when the container is in position, and means adapted to lock said hook in engaging position and to disengage said hook from its keeper when it is desired to remove the container.

8. In a carrier of the character described having a carrier member and a container member to be locked thereto, the combination of a hook and a pivotal axle on said carrier member for supporting said hook, a keeper on said container member adapted to interlock with said hook when the container is placed on said carrier, said hook having an oblong hole in which said axle supports the hook, a lift stop fixed on said carrier, said hook being suitably shaped to

engage said lift stop before the lower hole portion engages the pivotal axle in case the container should rise from the carrier while the hook and keeper are in engagement.

5 9. In a carrier of the character described having a carrier member and a container member to be locked thereto, the combination of a hook and a pivotal axle on said carrier member for supporting said hook,
10 a keeper on said container member adapted to interlock with said hook when the container is placed on said carrier, said hook having an oblong hole in which said axle supports the hook, a lift stop fixed on said
15 carrier, said hook being suitably shaped to engage said lift stop before the lower hole portion engages the pivotal axle in case the container should rise from the carrier while the hook and keeper are in engagement, and
20 interlocking means between said lift stop and the hook portion engaging it, for pre-

venting said two elements from sliding upon each other under the strain exerted by the rising container.

10. In a carrier of the character described 25 having a carrier member and a container member to be locked to said carrier member, the combination of a pivoted hook and a keeper each attached to one of said mem- 30 bers, said hook tending to remain in a definite normal position, and means on said keeper for causing said hook to engage said carrier when the container is placed on said carrier, and means adapted to lock said hook in engaging position and to cause the dis- 35 engagement of said hook from said keeper, the locking means of a suitable number of hooks on said carrier being interconnected and means geared to said interconnection for operating all of said locking and dis- 40 engaging means in unison.

FRANZ EDER.