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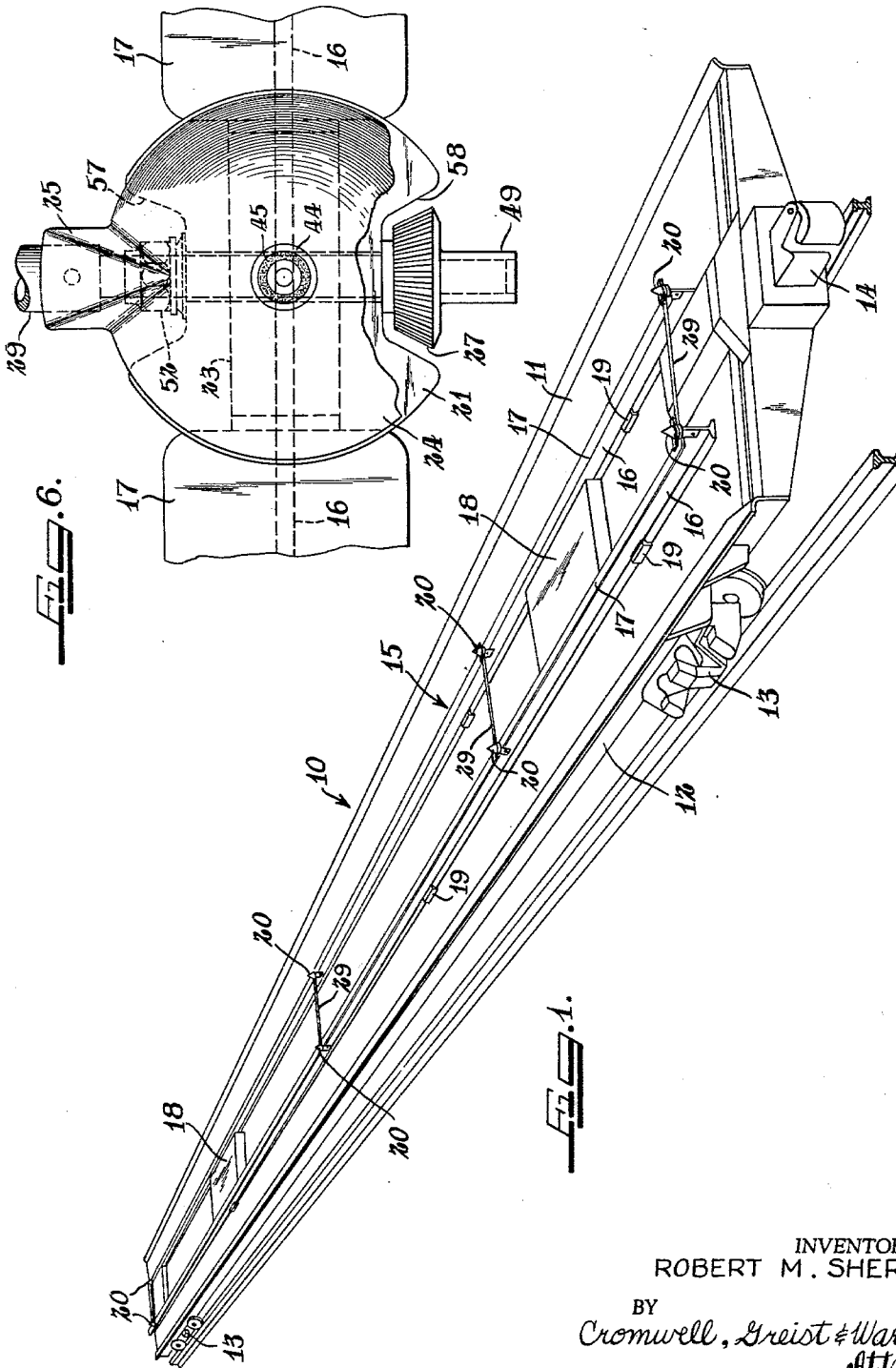
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CONTAINER LOCKING DEVICES AND ASSEMBLIES

Filed Feb. 15, 1963

6 Sheets-Sheet 1



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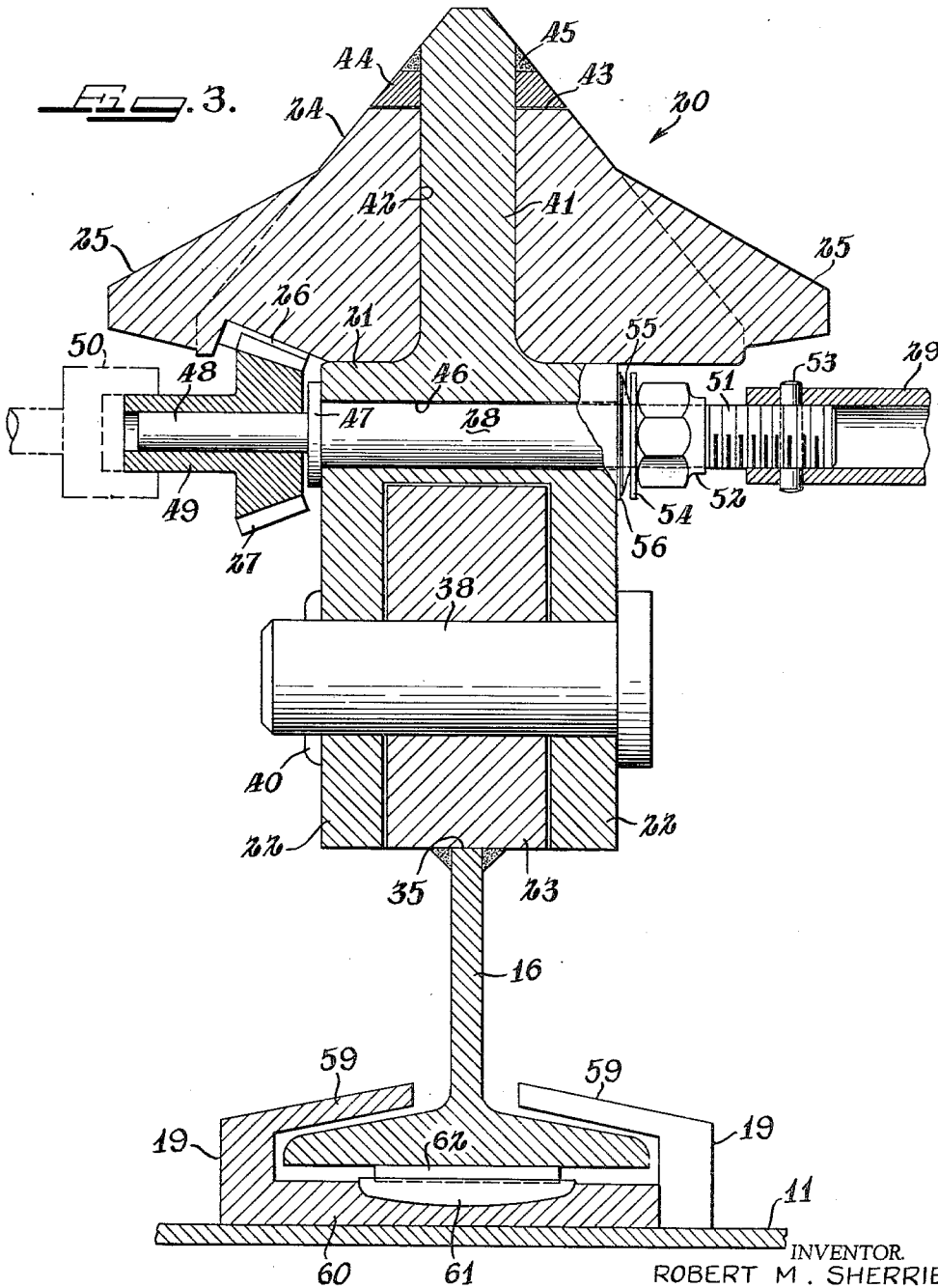
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6 Sheets-Sheet 3



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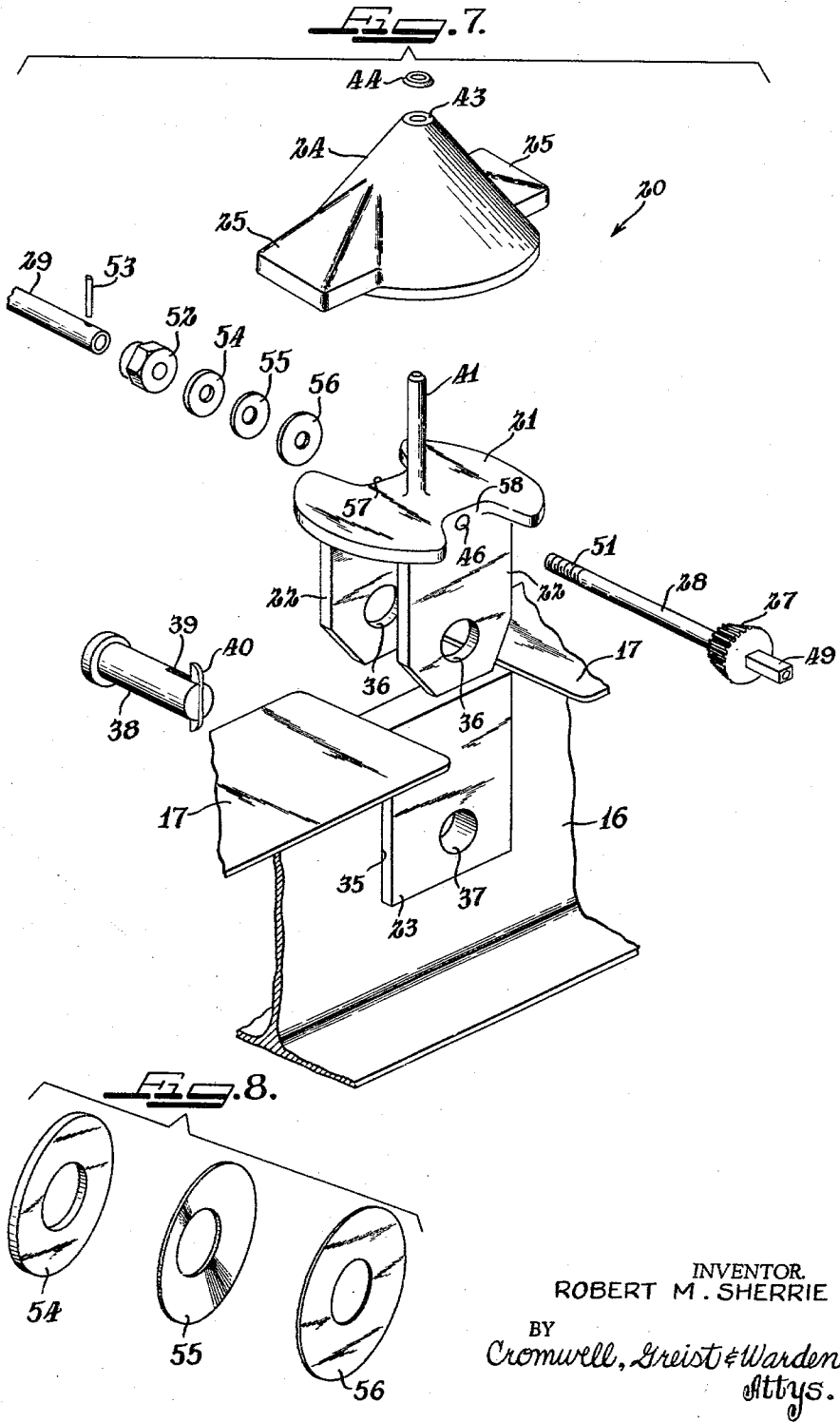
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6 Sheets-Sheet 5



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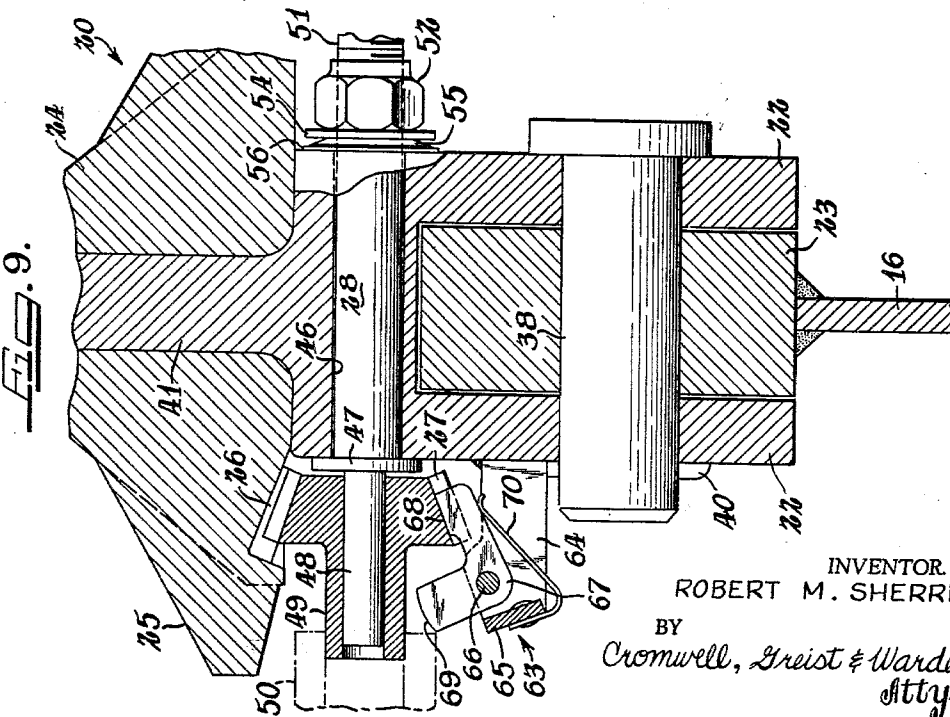
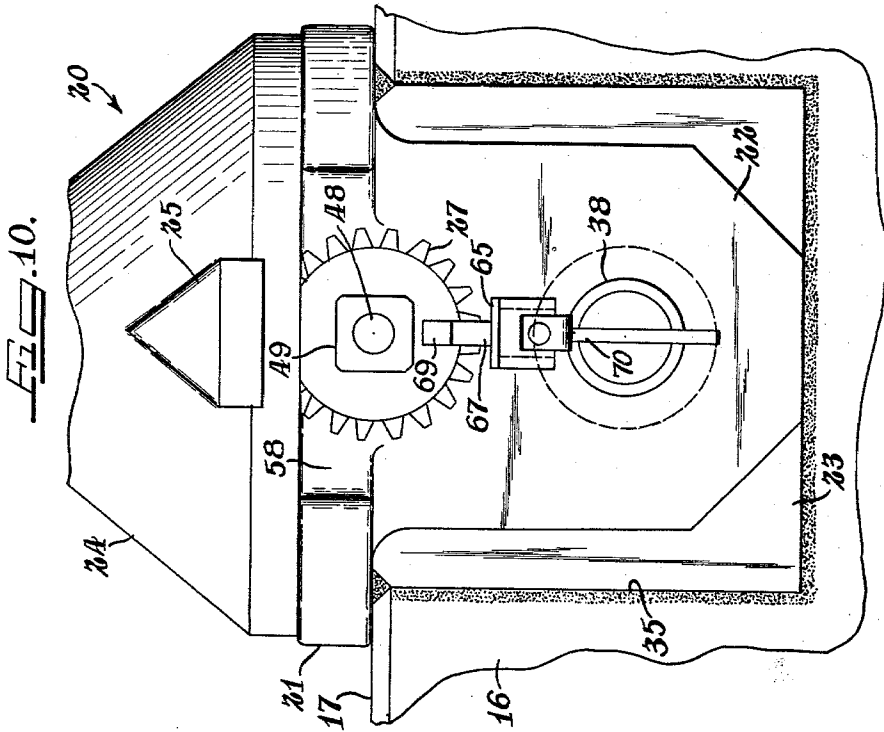
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CONTAINER LOCKING DEVICES AND ASSEMBLIES

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6 Sheets-Sheet 6



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3,193,238
CONTAINER LOCKING DEVICES AND
ASSEMBLIES

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The invention is directed to new and improved forms of container locking devices and assemblies comprising the same, the devices and assemblies being particularly adapted for use with railway cars for container lading attachment thereto, but also being readily usable with other types of vehicles where appropriate.

It is an object of the invention to provide new and improved lading attachment means in the form of container locking devices and assemblies thereof, the attachment means including new and improved container fixing means as well as new and improved operating and holding means.

Another object is to provide new and improved lading attachment means adapted for use in a railway car for container fixing, holding and locking thereon in a new and improved manner.

Still a further object is to provide a new and improved form of container support rack assembly adapted for use on a railway car, the rack assembly including uniquely arranged and cooperating container attachment means providing for controlled positioning of containers, the rack assembly and container attachment means being particularly adapted to accommodate longitudinal forces applied thereto and to the containers supported thereon during operative use of the same on a railway car.

Still another object is to provide new and improved position fixing means forming a part of container locking means whereby the operative positioning of movable elements of the locking means may be maintained to prevent inadvertent unlocking thereof.

Other objects not specifically set forth will become apparent from the following detailed description of the invention made in conjunction with the accompanying drawings wherein:

FIG. 1 is a perspective of an open deck railway car having mounted thereon a cushioned rack assembly constructed in accordance with the concepts of the subject invention and including as a part thereof the new and improved lading attachment means of the invention;

FIG. 2 is a fragmentary perspective of a pair of operatively interconnected lading attachment means of the invention illustrating the operative use thereof on a rack assembly in cooperation with a container supported thereon;

FIG. 3 is a transverse vertical section of one of the attachment means illustrated in its operative mounted position on a rail member of the rack assembly;

FIG. 4 is a fragmentary elevation of the attachment means as viewed from the outer side thereof;

FIG. 5 is a fragmentary elevation of the attachment means as viewed from the inner side thereof;

FIG. 6 is a fragmentary plan view of the attachment means;

FIG. 7 is an exploded perspective of the attachment means;

FIG. 8 is an exploded perspective of one form of operational control means forming a part of the attachment means;

FIG. 9 is a fragmentary transverse section of the attachment means illustrating the use of another form of operational control means forming a part thereof; and

FIG. 10 is a fragmentary elevation of the modified attachment means of FIG. 9 as viewed from the outer side thereof.

FIG. 1 illustrates a piggyback railway car 10 with which the rack assembly and special attachment or lock means of the present invention are particularly adapted for use. The car 10 includes an open deck portion 11 forming a part of a suitable type of underframe 12 which is supported adjacent opposite ends thereof by wheel trucks 13. Opposite ends of the underframe 12 carry couplers 14 and the rack assembly 15 of the invention is mounted along the deck portion 11 centrally and longitudinally thereof. The rack assembly 15 includes a pair of transversely spaced and longitudinally continuous rail members 16 which are I-beams in the form illustrated. Each rail member includes a flat top surface portion 17 on which containers are adapted to be received in vertically supported relation. Any suitable number of a known type of cushion assembly 18 are positioned intermediate the rail members 16 and operatively interconnects the rack assembly 15 to the car 10. The cushion assemblies 18 provide for controlled relative movement between the rack assembly 15 and car 10 longitudinally thereof in response to operational forces applied to the car, such as those arising from impacts in buff or draft. Suitable rail member tie-down means 19 provide for controlled movement of the rack assembly 15 relative to the car 10 in the known manner.

The rack assembly includes as a part thereof a plurality of longitudinally spaced container attachment units mounted on the rail members. Each container attachment unit includes a pair of operatively interconnected lock members 20 arranged to engage adjacent end portions of containers in a manner to be described. With the arrangement illustrated in FIG. 1, three containers can be carried by the car 10 between the longitudinally spaced pairs of lock members 20. Intermediate lock members 20 cooperate simultaneously with juxtaposed ends of adjacent containers.

Referring particularly to FIG. 2, the cooperating pairs of lock members 20 are mounted in recessed relation in the transversely spaced rail members 16. Each lock member generally includes a base member having as a part thereof a horizontal shear plate 21 and depending attachment ears 22 with the latter being received downwardly over the opposite side surfaces of a mounting block 23 fixed in the recess of a rail member 16. A rotatably mounted cone-shaped lading lock means in the form of a locking head 24 is carried by the base member above the shear plate 21 thereof, the locking head including a pair of oppositely positioned, horizontally outwardly projecting locking flanges 25 shown in the container locking position in FIG. 2. A peripheral bottom surface portion of the locking head 24 is provided with a gear track 26 in engagement with a bevel gear 27 fixed on a transverse operating shaft 28 extending through the base member, these various parts constituting operating means for the lock means. The operating shafts of the paired lock members 20 are suitably coupled by a tube-like connecting link 29 for simultaneous operation of each of the lock members from either side of the car 10.

An end portion of a suitable container 30 is illustrated in FIG. 2 as being provided with a pair of transversely spaced lock castings 31 arranged in flush relation with the outer end wall portion of the container. Each casting 31 includes a recessed area 32 defined along the bottom thereof by a shelf-like locking plate lip portion 33 over which one of the locking flanges 25 is received. The outer edge surface 34 of the lip portion 33 is provided with an arcuate configuration so as to closely conform with the shape of the outer surface portion of the shear plate 21 for a purpose to be described. In general, the container 30 is placed in vertically supported engagement with the top surfaces 17 of the rail members 16. Rotation of the locking heads 24 results in movement of the

locking flanges 25 into and out of overlying relation with the lip portions 33 of the container lock castings 31. Operative locking position of the heads 24 will place the flanges 25 in longitudinally directed position, the inoperative position of the heads 24 placing the flanges in transversely directed relation. In the unlocking position of the members 20 adjacent containers may be readily positioned on or removed from the rack assembly 15. The conical shape of the locking heads 24 provides for proper final positioning of the containers between the spaced pairs of lock members 20.

FIGS. 3-7 illustrate the basic elements of each lock member 20 in detail. The rail member 16 is formed with a generally rectangular recess 35 extending downwardly through the top flange thereof, FIG. 7 illustrating the feature of the top flange being interrupted to receive therebetween the block member 23 which is fixed in the recess 35 and completely fills the same. The block member 23 as best shown in FIG. 3 is of substantial thickness and is intended to provide a rigid base support for the lock member 20. As best shown in FIG. 7, the base member includes a pair of depending attachment ears 22 which are closely received over the opposite side faces of the block member 23 and which are formed with transversely aligned apertures 36 located for alignment with the intermediate aperture 37 formed in the block member 23. A locking pin 38 of any suitable type is removably received through the aligned apertures 36 and 37 to fix the base member on the rail member. The particular locking pin 38 illustrated is formed in one end thereof with a pair of slots 39 into which is forced a transverse locking flange 40 projecting radially from the end of the pin. The pin is inserted through the aligned apertures with the locking flange 40 ultimately being forced into the slots 39 to hold the pin in place. The locking flange 40 may be readily removed from the pin for dismounting of the block member 20.

Referring particularly to FIGS. 3 and 7, the shear plate 21 of the base member has mounted centrally thereon an upwardly projecting spindle 41 which is fixed to the base member. The locking head 24 is provided with a vertical bore 42 receiving therein the spindle 41 with the latter projecting outwardly above the top surface portion 43 of the head 24. A washer 44 having an outer surface of frusto-conical shape is received about the top projecting end portion of the spindle 41 thus providing an end bearing for the head 24. The washer 44 is fixed to the spindle by an annular weld 45 (FIG. 3). With this arrangement the head 24 can be rotated on the spindle 41 between the washer 44 and the top surface of the shear plate 21.

FIGS. 3 and 7 best illustrate the provision of a transverse bore 46 extending through the base member in the shear plate area above the space between the attachment ears 22 in which the block member 23 is received. The operating shaft 28 is rotatably received in the bore 46 and opposite end portions thereof project beyond opposite side margins of the shear plate 21. The outer end portion of the shaft 28 is formed with a radial annular shoulder 47 retained in engagement with the adjacent side surface portion of the base member and, among other things, limiting the extent to which the shaft 28 is inserted through the base member. Outwardly of the shoulder 47 the shaft 28 is formed with a reduced gear attachment end 48 about which is fixedly received the gear 27. This gear includes an outer sleeve portion 49 having flat outer surface portions adapted to be engaged with a suitable shaft rotating tool 50 of a type shown in broken lines in FIG. 3.

The opposite end of the shaft 28 is formed with a continuous thread 51 receiving thereon an adjustment means in the form of a lock nut 52. The outermost end portion of the shaft 28 is received within the tubular connecting link 29 and is fixed thereto by a removable transverse locking pin 53.

The lock nut 52 is in engagement with a metallic washer 54 which in turn is in abutment with a frusto-conical spring metal disc 55, the disc having its end of greatest diameter in engagement with an annular metallic wear pad 56 of washer-like configuration. These elements are specifically shown in FIG. 8 and cooperatively function to frictionally hold the shoulder 47 of the shaft 28 in engagement with the adjacent bearing surface of the base member. Movement of the lock nut 52 along the threaded portion 51 of the shaft 28 controls the tensioning of the spring disc 55 and the degree to which the shaft 28 is pulled or urged inwardly through the base member. This in turn provides for adjustment of the degree of friction established between the mating surfaces of the shoulder 47 and base member.

FIGS. 4-7 illustrate the shear plate 21 as being provided with inner and outer recessed areas 57 and 58 respectively. The inner recess 58 permits ready access to the frictional shaft retaining means for adjustment of the lock nut 52 to vary the amount of resistance to shaft rotation. The outer recess 58 permits accommodation of the bevel gear portion 27 extending into engagement with the gear track 26 of the head 24. The gear track 26 need not necessarily be circumferentially continuous as the shaft 28 can be rotated alternately in a clockwise and counterclockwise direction for limited rotation of the head into and out of locking position. Rotation of the shaft 28 is brought about by application of the tool 50 to the flattened sleeve portion 49 of the bevel gear 27 and the locking head 24 is thus rotated from one position to another. The force applied by the tool 50 will be adequate to overcome the friction developed by the spring disc 55 between the shoulder 47 and the adjacent bearing surface of the base member. However, this friction is sufficient to prevent inadvertent rotation of the locking head 24 either when a container 30 is locked thereby or when the head is in the unlocked position. Accordingly, an uncomplicated position retention arrangement is provided in the container locking member 20 to prevent unintentional movement of the locking head.

The journalling of the shaft 28 through the substantially thick base member provides an efficient operational mounting arrangement for the shaft bearing in mind that the operating force applied by a tool 50 to one of the lock members 20 must be transmitted to the adjacent interconnected lock member through the link 29. Thus the short operating shaft 28 is supported throughout substantially its entire length for the application of sufficient torque to the interconnected locking head 24 as well as the interconnecting tube 29 and the operating shaft 28 of the adjacent lock member 20. Each lock member is in the form of a compact assembly which can be readily applied to and detached from a rail member 16.

FIG. 3 illustrates a known type of tie-down arrangement for the rail members 16 of the rack assembly 15. This arrangement includes the means 19 which are in the form of brackets having top flange portions 59 overlying the bottom flange portions of the rail member, and bottom flange portions 60 extending between the deck 11 and the bottom surface of the rail member 16. Each bottom flange portion 60 carries a bearing member 61 there-in provided with a friction reducing pad 62 against which the bottom surface of the rail member is received. The pad 62 may be formed from Teflon or the like and permits ready sliding of the rail member therealong relative to the car 10.

Upon the application of an impact force to the car 10, the underframe 12 will move in response thereto and the rack assembly 15 will slide longitudinally along the deck 11 to an extent as controlled by the cushion assemblies 18 in the well known manner. The cushion assemblies control the magnitude of forces of impact ultimately applied to the containers supported on the rack assembly, such forces being gradually applied thereto so as to prevent lading damage. Ultimately the rack assembly 15

and the containers supported thereon will gain momentum and begin slowly to move with the car 10 or relative thereto in the direction of original movement of the car. This momentum must be transmitted by the rack assembly to the containers supported thereon. In this respect the lock members 20 of the invention function to accommodate stresses in shear to maintain proper positioning of the containers on the rack and accommodate transmission of forces therebetween. The shear plate 21 as previously described is formed with outer arcuate surfaces which closely conform to and are placed in closely spaced relation with the arcuate surfaces 34 of the container lock castings 31. The shear plates 21 as best shown in FIGS. 2 and 4-6 are positioned to project above the top surface 17 of the rail member 16 and actually overlap the top surface portions adjacent the rail member recess 35. Thus the shear plates 21 are available to an end of each container for the transmission of forces of momentum of the like thereto. This arrangement prevents the application of shear forces to the locking head 24 and the spindle 41, the latter obviously not being designed to accommodate any substantial stresses in shear. Furthermore, the shear plates 21 maintain proper spacing between adjacent containers.

FIGS. 9 and 10 illustrate a lock member 20 of the type described provided with an additional or substitute shaft retention means in the form of a gear detent lock 63. The outermost attachment ear 22 of the base member has mounted thereon a bracket member including a pair of transversely spaced and outwardly projecting plates 64 interconnected at their outer ends by a transverse plate 65. The plates 64 mount therebetween a transverse pin 66 receiving thereon a generally L-shaped lock arm 67. The horizontal portion of the lock arm 67 includes a longitudinal tooth-like detent portion 68 dimensioned to be received between the teeth of the bevel gear 27. The vertical portion 69 of the lock arm 67 is in the form of a cam actuated means which is positioned to be engaged by an end surface portion of the tool 50 when the same is operatively received about the flatted sleeve portion 49 of the gear 27. A leaf spring 70 extends between the plates 64 from one end fixed attachment with the transverse plate 65 into opposite end resilient engagement with the horizontal portion of the lock arm 67 as shown in FIG. 9. In this manner the gear detent 68 is continuously urged by the spring 70 into locking engagement with the bevel gear 27, the arm being cocked in its locking position to conform with the bevel of the gear 27.

In the locking position of the lock 63 the shaft 28 is fixed against rotation and the locking head 24 cannot be moved from its particular position. Upon introduction of the tool 50 about the sleeve portion 49 of the bevel gear 27, the end of the tool will engage the vertical portion 69 of the lock arm 67. FIG. 9 illustrates initial engagement prior to complete telescoping of the tool about the sleeve. Continued advancement of the tool 50 along the sleeve portion 49 will result in the camming of the lock arm 67 in a clockwise direction as viewed in FIG. 9 against the action of the spring 70. This results in the disengagement of the detent 68 from the teeth of the gear 27 thus freeing the shaft 28 for rotation. Withdrawal of the tool 50 from the sleeve portion 49 results in immediate return of the detent 68 into engagement with the teeth of the gear by reason of the action of the spring 70.

The lock 63 may be used either as the sole means of locking the shaft 28, or can be used in combination with the friction locking arrangement involving the spring disc 55 previously described. When the mechanical type of lock 63 is used, the spring disc 55 may be relied upon solely to prevent binding of the shaft 28 in the base member. In other words, the lock nut 52 may be retracted adequately to merely maintain a sufficient longitudinal force applied to the shaft 28 so as to permit ready rota-

tion of the shaft and yet not permit excessive play thereof relative to the base member.

Obviously certain modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. In a railway car wherein container type lading support means are arranged longitudinally of the deck portion of the car to receive lading in supported engagement with support surface portions thereof, the provision of lading attachment means associated with said support means and projecting above said surface portions thereof, said attachment means including horizontally arranged shear plate means fixed to said support means and arranged for end abutment with lading to resist longitudinal movement of lading relative to said support means, lading lock means pivotally carried by said shear plate means, and operating means for said lock means.

2. In a railway car wherein container type lading unit support means are arranged longitudinally of the deck portion of the car to receive lading units in supported engagement with support surface portions thereof, the provision of lading unit attachment means associated with said support means and projecting above said surface portions thereof, said attachment means including horizontally arranged shear plate means fixed to said support means and arranged for end abutment with lading units to resist longitudinal movement of lading units relative to said support means, lading unit lock means pivotally carried by said shear plate means, and operating means for said lock means, said attachment means being arranged transversely across said car in longitudinally spaced relation therealong to be engaged with opposite ends of lading units, the shear plate means and lock means of single longitudinally intermediate attachment means being arranged for simultaneous engagement with adjacent ends of adjacent lading units.

3. A container support rack assembly comprising at least a pair of transversely spaced and longitudinally extending rail-like members for cushioned mounting on the deck portion of a railway car, container attachment means mounted on said rail-like members at spaced intervals, said rail-like members including flat top surface portions to receive containers in supported relation thereon, recesses formed in said top surface portions receiving said attachment means therein, each of said attachment means comprising horizontal shear plate means fixed to a rail-like member and projecting above the top surface portion thereof for end abutment with opposite ends of adjacent containers, container lock means pivotally mounted on said plate means above the same for locking engagement with opposite ends of adjacent containers, and operating means engaged with said lock means for pivoting thereof.

4. A container support rack assembly comprising at least a pair of transversely spaced and longitudinally extending rail-like members for cushioned mounting on the deck portion of a railway car, container attachment means mounted on said rail-like members at spaced intervals, said rail-like members including flat top surface portions to receive containers in supported relation thereon, recesses formed in said top surface portions receiving said attachment means therein, each of said attachment means comprising horizontal shear plate means fixed to a rail-like member and projecting above the top surface portion thereof for end abutment with opposite ends of adjacent containers, container lock means pivotally mounted on said plate means above the same for locking engagement with opposite ends of adjacent containers, and operating means engaged with said lock means for pivoting thereof, said operating means including shaft means rotatably journaled transversely through said plate

means and including gear means engaged with said lock means.

5 5. The rack assembly of claim 4 wherein said shaft means includes adjustable spring lock means in frictional engagement with said plate means to maintain the pivoted position of said lock means.

10 6. The rack assembly of claim 4 wherein said shaft means adjacent said gear means includes an operating end portion adapted for engagement by tool means, lock means mounted relative to said operating end portion and having means in engagement with said gear means, said lock means including cam actuated means for operation by said tool means to unlock said gear means.

15 7. Container locking means comprising a base member having a horizontal shear plate portion and depending attachment means, a vertically extending spindle fixed to said shear plate portion, a locking head pivotally mounted on said spindle, shaft means rotatably transversely journaled in said base member and having end portions projecting therefrom, one end portion being provided with tool engaging means for rotation of said shaft means, gear means fixed on said shaft means inwardly of said tool engaging means, said shear plate portion being recessed to receive said gear means below a peripheral portion of said locking head, and gear track means on said locking head in engagement with said gear means, the other end portion of said shaft means being adapted for coupling with a shaft means of another locking means for simultaneous operation thereof.

20 8. Container locking means comprising a base member having a horizontal shear plate portion and depending attachment means, a vertically extending spindle fixed to said shear plate portion, a locking head pivotally mounted on said spindle, shaft means rotatably transversely journaled in said base member and having end portions projecting therefrom, one end portion being provided with tool engaging means for rotation of said shaft means, gear means fixed on said shaft means inwardly of said tool engaging means, said shear plate portion being recessed to receive said gear means below a peripheral portion of said locking head, gear track means on said locking head in engagement with said gear means, said one end portion having associated therewith a gear means detent pivotally mounted on said base member, said detent including means in engagement with the teeth of said gear means to maintain the pivoted position of said locking head, and cam means forming a part of said detent for engagement by a shaft means operating tool for simultaneous release of said gear means, the other end portion of said shaft means being adapted for

coupling with a shaft means of another locking means for simultaneous operation thereof.

9. Container locking means comprising a base member having a horizontal shear plate portion and depending attachment means, a vertically extending spindle fixed to said shear plate portion, a locking head pivotally mounted on said spindle, shaft means rotatably transversely journaled in said base member and having end portions projecting therefrom, one end portion being provided with tool engaging means for rotation of said shaft means, gear means fixed on said shaft means inwardly of said tool engaging means, said shear plate portion being recessed to receive said gear means below a peripheral portion of said locking head, and gear track means on said locking head in engagement with said gear means, the other end portion of said shaft means including adjustable friction means in engagement with said base member to maintain the pivoted position of said locking head.

20 10. The container locking means of claim 9 wherein said adjustable friction means includes spring means carried by said other end portion of said shaft means and active against said base member to restrain rotation of said shaft means, and spring tension adjustment means on said other end portion and in engagement with said spring means.

25 11. In a container locking means including a fixed base member, a locking member movably mounted on said base member, and operating means having gear means in engagement with said locking member and tool engaging means in association with said gear means, the provision of locking member position fixing means pivotally mounted on said base member, one end portion of said fixing means having detent means in engagement with the teeth of said gear means, and another end portion of said fixing means having cam means arranged for engagement by a tool applied to said tool engaging means to pivot said detent means out of engagement with said teeth.

References Cited by the Examiner

UNITED STATES PATENTS

602,262	4/98	La France	74—545 X
1,378,096	5/21	Chat	5—328
1,389,504	8/21	Harrison	254—103
3,044,420	7/62	Packard	248—361
3,073,589	1/63	Hohwart	254—103
3,111,341	11/63	Fujioka et al.	248—361
3,129,672	4/64	Guttridge et al.	248—361

50 CLAUDE A. LE ROY, *Primary Examiner.*