March 22, 1966 G. M. MAGARIAN ETAL 3,241,502

LOAD DIVIDER MECHANISM

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FIG. 2.

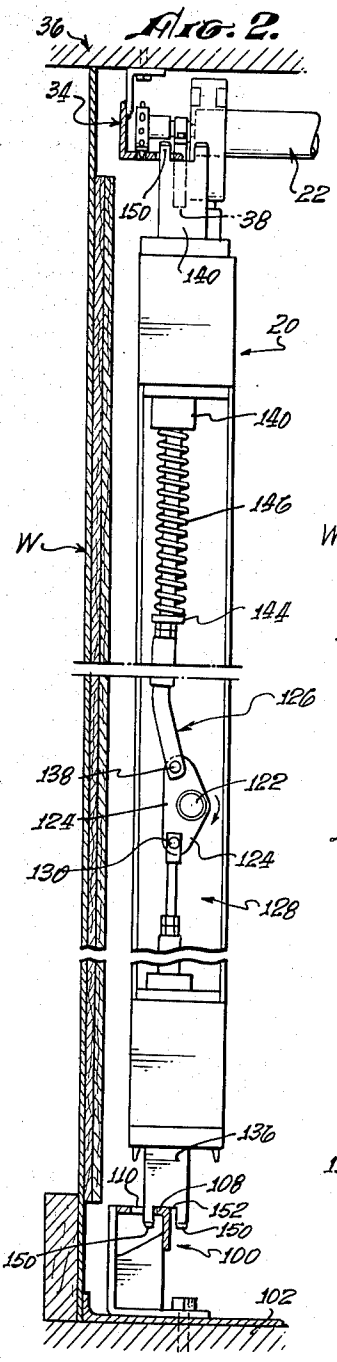
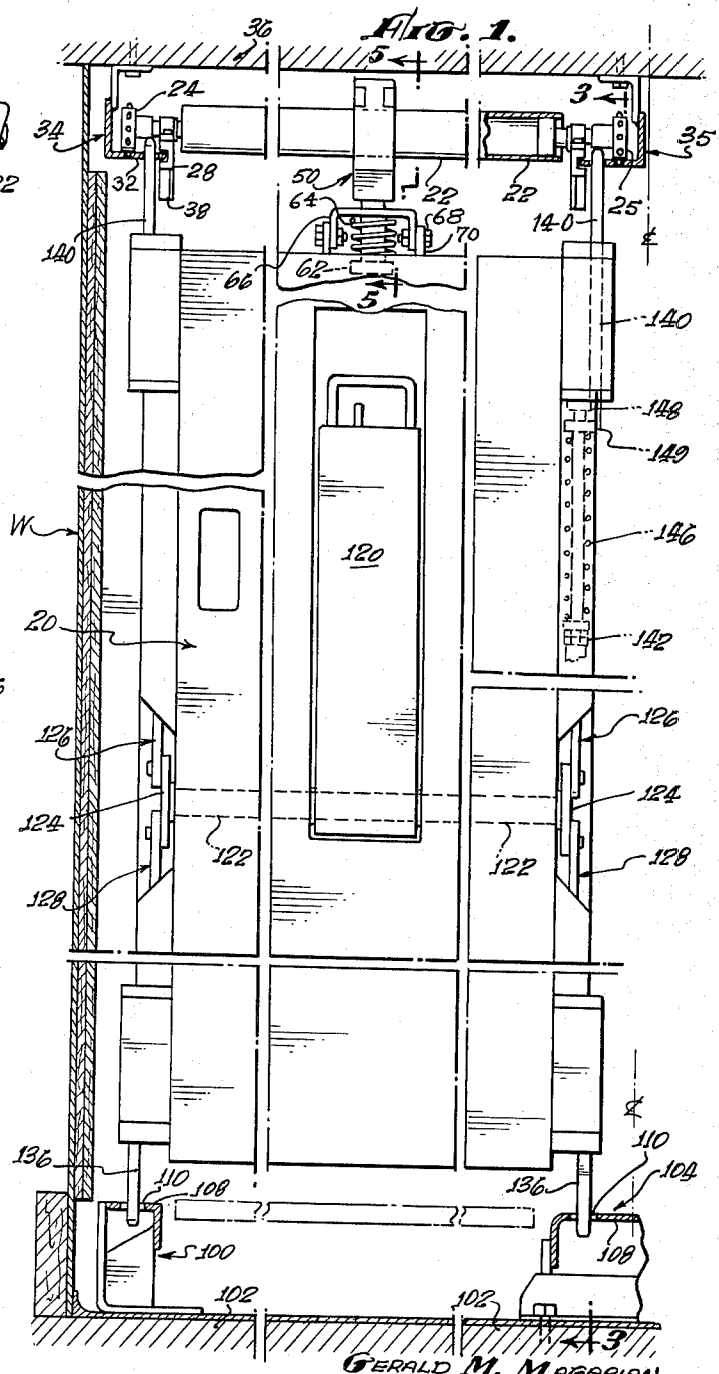


FIG. 1.



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FIG. 5a.

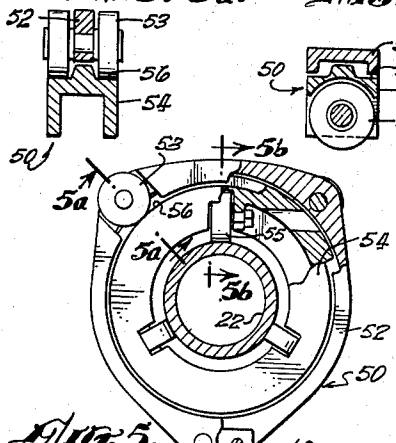


FIG. 5b.

FIG. 5.

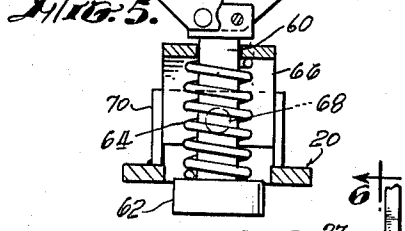


FIG. 1a.

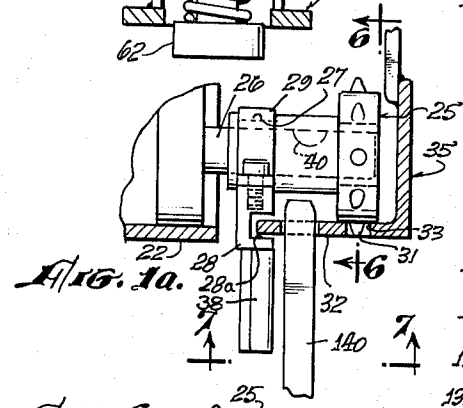


FIG. 6.

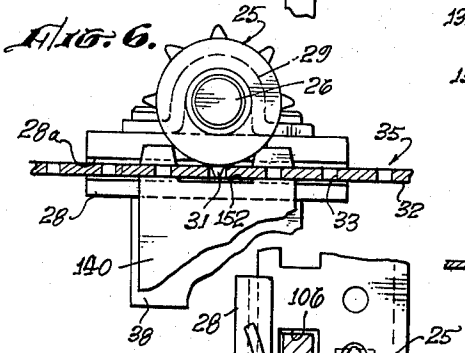


FIG. 7.

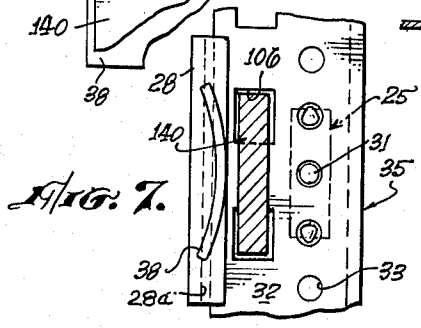


FIG. 3.

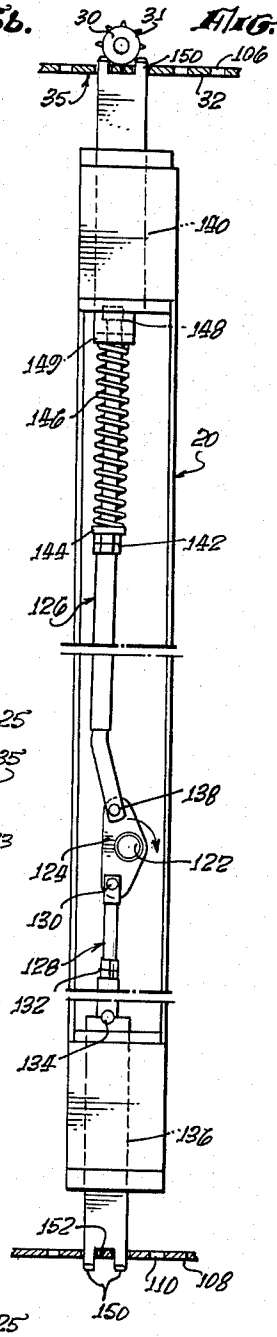
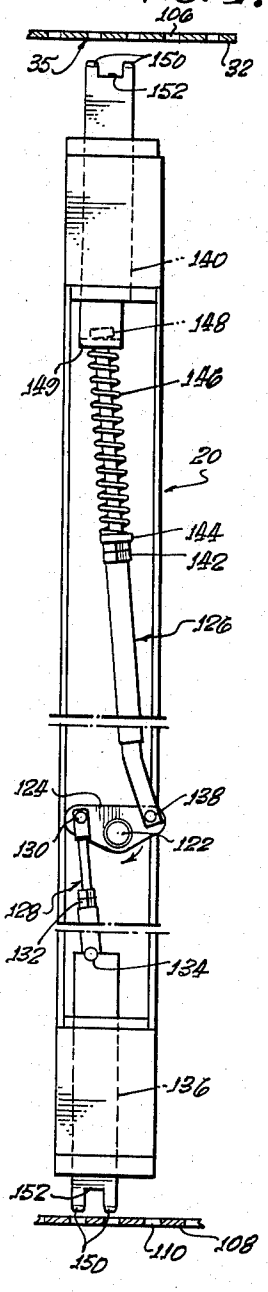


FIG. 4.



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FIG. 8.

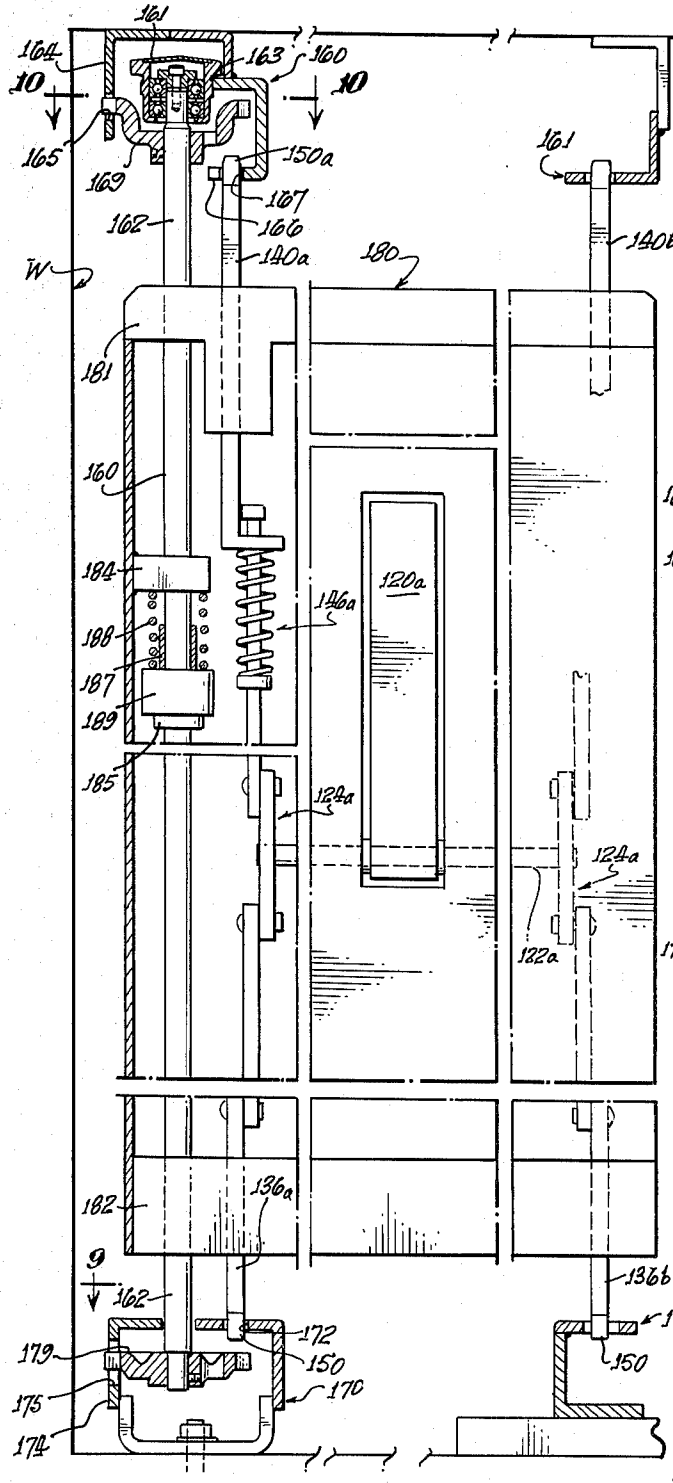


FIG. 10.

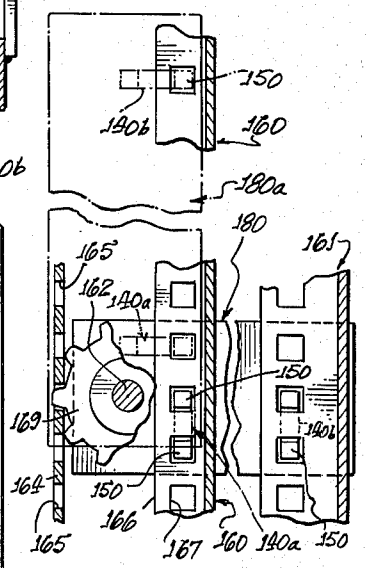
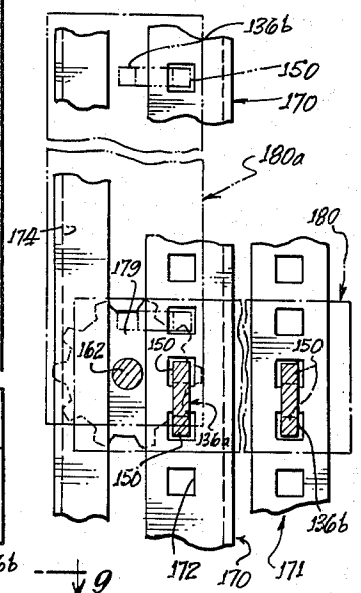


FIG. 9.



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United States Patent Office 3,241,502
Patented Mar. 22, 1966

3,241,502

LOAD DIVIDER MECHANISM

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Filed Aug. 22, 1963, Ser. No. 303,761
15 Claims. (Cl. 105—376)

This invention has to do with load dividers or movable bulkheads for transport vehicles, such for instance as vans or railroad freight cars, and, although not necessarily so limited, is more particularly concerned with divider gates that are suspended from an upper rail or beam to facilitate movement between working and idle position in the vehicle. Such bulkheads or gates are commonly suspended to swing about either a vertical or horizontal axis. Some known suspensions involve swinging about a vertical axis on the center line of the gate, others about a vertical axis at a side edge of the gate.

Certain aspects of the invention, particularly those having to do with locking the gate in transverse position across a car interior or in idle position, are applicable to suspensions of any such type. The invention permits the gate suspension to be relieved of inertial loads when the gate is locked, but without requiring excessive force for manipulating the gate from one position to another.

Another aspect of the invention concerns improved supporting rail structure, whereby a single rail flange may support the gate and also carry formations both for defining a desired gate position and for locking the gate in that position. A further aspect of the invention provides locking pins of improved form which cooperate in improved manner with locking formations on the supporting rail structure.

The various characteristics of the invention will be best understood from the following detailed descriptions of presently preferred and illustrative embodiments, with reference to the accompanying drawings, in which:

FIG. 1 is an elevational view of one embodiment of the invention, showing a half-width gate in locked transverse position;

FIG. 1*a* is an enlargement of a part of FIG. 1;

FIG. 2 is a view showing a gate locked in position against a car side-wall;

FIG. 3 is a view taken as indicated by line **3—3** on FIG. 1, showing the gate locked in working position;

FIG. 4 is a view similar to FIG. 3 showing the gate in unlocked position;

FIG. 5 is an enlarged section on line **5—5** of FIG. 1;

FIGS. 5*a* and 5*b* are detail sections on lines 5*a*—5*a* and 5*b*—5*b* of FIG. 5;

FIG. 6 is a detail section on line **6—6** of FIG. 1*a*;

FIG. 7 is a section on line **7—7** of FIG. 1*a*;

FIG. 8 is an elevational view of another embodiment of the invention, corresponding generally to FIG. 1;

FIG. 9 is a section at enlarged scale on line **9—9** of FIG. 8; and

FIG. 10 is a section at enlarged scale on line **10—10** of FIG. 8.

Referring first to FIGS. 1 to 5, a half width gate, generally designated **20**, may have a body constructed in any suitable manner giving sufficient rigidity and strength. For instance, it may primarily be constructed of corrugated sheet with such a gate thickness dimension as indicated in FIGS. 2, 3 and 4.

The gate **20** is suspended from a pair of overhead longitudinal rails **34** and **35** that are secured to and depend from the ceiling structure **36** of the car. A tubular shaft **22** extends transversely of the car between rails **34** and **35**, the shaft ends carrying wheel formations **24** and **25** which roll on horizontal flanges **32** of the respective rails. In the preferred form of the structure, wheels **24**

and **25** are rotatively fixed on shaft **22** and carry sprocket teeth **31** which engage suitably spaced perforations **33** of rack form in the respective rail flanges **32** (see FIG. 1*a*). That sprocket action maintains shaft **22** at right angles to the length of the car, in the manner described, for example, by J. R. Moriarty in Patent 1,388,819.

One of the wheels, shown as left wheel **24** in FIG. 1, may be fixedly mounted on tubular shaft **22** by means of a stub shaft; while the other wheel **25** is preferably splined to its stub shaft **26**, as indicated at **40** in FIG. 1*a*. Free axial movement of wheel **25** then accommodates any variation in transverse spacing of the two rails **34** and **35** in the car. Each of the sprocket wheels is positively retained in sprocketed engagement with its rail by a retaining member **28**, which is rotatably mounted on the wheel hub, as by the strap **29** which fits freely in a peripheral channel **27** in the elongated hub. A channel **28***a* on member **28** freely receives the edge of rail flange **32**, and is made long enough (FIG. 7) to prevent binding as shaft **22** rolls along the rails. Member **28** may carry a depending plate **38** adapted to engage the locking pins, to be described, and to facilitate their operation. In this half width gate form both rails **34** and **35** shown in FIG. 1 are duplicated at the other side of the center line of the car (indicated at CL) by similar rails for carrying the suspension shaft for another half-width gate.

A trolley **50** of novel type rides shaft **22** and pivotally carries the gate **20**. Trolley **50** comprises the outer load-carrying ring **52** and the inner or intermediate ring **54**, arranged coaxially with each other and with shaft **22**. Three rollers **55** are journaled on inner ring **54** at uniform angular intervals on respective tangential axes in the plane of the ring. Those rollers engage the outer cylindrical surface of shaft **22** and enable ring **54** to move freely longitudinally of that shaft, which is typically transverse of the vehicle. Two pairs of rollers **53** are journaled on outer ring **52** on spaced axes parallel to the ring axis. Rollers **53** ride track surfaces **56** formed on inner ring **54**, and permit free relative rotation of the two ring structures with respect to their common axis. The two rings are preferably of interfitting sectional form, as illustratively shown in FIGS. 5*a* and 5*b*, so that once assembled they are interlocked. The outer ring may comprise two mating pieces which may be disassembled to separate the rings. Rollers **55** accommodate trolley movement along shaft **22**, while rolling movement of the shaft along rails **34** and **35** is accommodated by rollers **53**.

Centrally under shaft **22**, outer ring **52** carries a depending suspension pin or bolt **60** having a head **62** at its lower end forming a seat for a spring **64**. The upper end of spring **64** presses upwardly on a U-shaped suspension member **66** that is pivotally bolted at **68** to brackets **70** secured centrally to the upper edge of gate **20**. The pivoting at **68** allows swinging of the gate about its upper suspension in the planes of FIGS. 2, 3 and 4; and the swivel formed by **66** on suspension pin **60** allows the suspended gate to be swung to any desired position about the central vertical axis of the swivel and the gate. As will later be pointed out, spring **64** normally carries a predetermined fraction of the weight of the gate.

The suspension means or trolley described in the two immediately preceding paragraphs is illustratively typical of a suspending trolley carrying the suspension pin or bolt **60** and in which that pin or bolt is movable both axially of and rotationally relative to the rotatable squaring shaft. It is further typical and illustrative of a trolley structure involving two concentric members, one surrounding the other and both surrounding the shaft, and in which one member is rotative relative to the shaft and the other member movable axially of the shaft, one of said members carrying the suspension pin or bolt **60**.

The means for locking the gate in either transverse position as in FIG. 1, or against a side wall as in FIG. 2, are shown in those figures and in FIGS. 3 and 4.

Below the lefthand upper longitudinal ceiling rail **34** a longitudinal floor rail **100** is secured to the car floor structure **102**; and below the central pair of longitudinal ceiling rails **35** a double longitudinal floor rail **104** is also secured to the floor structure **102**. Each upper rail has in its flange **32** a series of longitudinally spaced perforations **106**, and flanges **108** of lower floor rails **100** and **104** have a similar series of spaced perforations **110**, central double floor rail **104** carrying two such perforation series to correspond to the upper double rails. FIGS. 3 and 4 show how the several locking pins cooperate with the central upper and lower rails, and FIG. 2 shows their cooperation with one pair of the vertically corresponding side rails.

Gate **20** carries a manually operable handle **120** mounted on and swinging about the axis of a shaft **122** that extends horizontally through the gate from one vertical edge to the other. At its ends shaft **122** carries two double throw crank members **124** to each of which one end of two linkages **126** and **128** are pivotally connected. The details of the linkages at both side edges of the gate are the same and are shown in FIGS. 3 and 4. Linkage **128** extends down from its crank connection **130**, with a length adjustment at **132**, to connect at **134** with a vertically guided sliding foot pin **136**. Linkage **126** extends up from its crank connection **138** to connect with a vertically guided sliding upper locking pin **140**. That linkage, with a length adjustment at **142**, carries a spring seat at **144**, seating spring **146** that presses up on locking pin **140**. Between the linkage itself and locking pin **140** there is a lost motion of any suitable kind, here illustrated as a head **148** on the linkage, that head being free to move up from foot **149** of locking pin **140** (FIGS. 1 and 3). After some free movement down from that position, the head engages foot **149** to pull locking pin **140** positively down.

Each locking pin **136** and **140** has at its rail engaging end preferably two perforations entering prongs **150** spaced to enter two adjacent rail perforations in the gate position of FIGS. 1, 3 and 4; and, in the gate position of FIG. 2, to enter one perforation, with the other prong inside the inside edge of the rail flange. Between the two prongs each pin has a footing surface at **152** adapted to seat on the respective rail flange between perforations, or, in the position of FIG. 2 inside the entered perforation.

Operation is as follows. In the transverse locked position of the gate, shown in FIGS. 1 and 3, handle **120** is up and recessed in the gate, where it is held by a latch mechanism, not shown. Cranks **124** are then in the relative position shown in FIG. 3, holding linkages **128** down and linkages **126** up. In that position the lower foot pins have been forced down relative to the gate, their prongs entering perforations in the lower rails, and their seating surfaces **152** seating on those rails to raise the gate to the relative position shown in those figures. In that raised position of the gate, suspension spring **64** is partially expanded, as in FIG. 1. Carrying a portion of the gate weight, it reduces the manual effort required to throw handle **120** to the gate raising and locking position. In the half-width gates here illustratively shown the expanded spring need only carry 15 to 20% of the gate weight to reduce the manual lever forces sufficiently. On a full width gate the expanded spring may carry a larger fraction of the gate weight. A further function of the spring is that, by placing a constant force equal to part of the gate weight on the suspension shaft **22**, it keeps that shaft and its associated structure from chattering.

As handle **120** is moved toward its locking position, upper linkage **126** moves toward its upper position, allowing the upper locking pins **140** to be moved up by springs **146** until their prongs enter the upper rail perforations **106** and their seating surfaces **152** have seated upwardly on the upper rail flanges. Then, the further movement of linkage **126** upwardly moves the lost motion head **148** up off seat **149** so that in the finally locked position of FIGS. 1 and 3, upper locking pins **140** are pressed up only by springs **146**. That spring pressed action, pressing up on the upper seated locking pins and pressing down on the gate via linkage **126**, takes care of variations in vertical distance between upper and lower rails, and holds the gate tightly between the upper and lower rails, avoiding looseness that might allow gate deterioration by chatter.

When handle **120** is released from its latch and lowered to throw cranks **124** to the position of FIG. 4, lower linkage **128** is pulled up relative to the gate. That first allows the gate to move down to a position such as shown in FIG. 4, where suspension spring **64** is closed or nearly so. With the gate then positively supported on the suspension, further movement of handle **120** and cranks **124** then pulls lower foot pins up to the position of FIG. 4, clearing the lower rails. Crank **124** also pulls down upper linkage **126**, closing the lost motion at **148**, **149** and pulling the upper locking pins down to the positions of FIGS. 4, clear of the upper rails.

The unlocked gate is then free for swinging movement about the vertical axis of the suspension and gate, and is free for movement with the supporting shaft **22** to any position longitudinally of the car, where it may again be locked in transverse position. Or the gate may be moved with its trolley moving along the overhead shaft, to a position either in the plane of the upper and lower rails central of the car (the upper right hand rail **35** and the lower floor rail **104**) or into a position closely against the side wall W as shown in FIG. 2. In any such position, throwing handle **120** up again forces the lower locking pins down, the upper locking pins up, and, with those pins in the positions shown in FIG. 2, raises the gate, puts the upper pins under their spring loading and thus leaves the gate snugly locked in that position.

In the positions of FIGS. 1, 2 and 3, with the upper and lower locking pins seated on their respective rails, it will be noted that springs **146** are compressed, the amount of that compression depending on the lost motion travel of linkage head **148** above pin foot **149** and on the length of springs **146**. The amount of that lost motion travel depends on how far the lower pins are projected, which is adjustable at **132**. The amount of that compression depends on those dimensions and adjustment; and, to the extent that the springs are compressed and hold the gate and lower pins **136** down, they oppose and prevent the lower pins from rising out of their locking holes due to shock that may tend to raise the gate.

When the gate is locked in idle position against the side wall W, the horizontal spacing of the pins on the gate is such that one prong **150** of each pin enters an aperture in the upper or lower rail with the other prong at the inside edge of the rail flange as shown in FIG. 2. The prong spacing, and hence also the pitch of the locking apertures **106** in the rails, is preferably an integral multiple of the pitch of sprocket teeth **31**, as illustrated most clearly in FIG. 7. That relation permits the locking apertures and prongs to be made large enough to withstand heavy loading, while retaining economy of fabrication. The arrangement illustrated has the further important advantage that the weight carrying roller, which in the present instance comprises the sprocket **24**, engages the rail close to the root of flange **32** where it has maximum strength not reduced by the relatively large locking apertures **106**.

As has been noted, suspension spring **64** carries a part of the gate weight and consequently reduces the manual effort necessary for lifting the gate. At the same time, by maintaining a continuous and uniform force upon the gate suspension, the spring prevents the various parts of that suspension from chattering under the vibration of the vehi-

cle in normal operation. Wear of the parts is thereby greatly reduced.

However, the stabilizing force exerted upon the suspension and on the gate is yielding in its nature, due to the resilience of the springs. Hence, although the stabilizing force is derived from the weight of the gate, the gate suspension is effectively isolated from the inertial mass of the gate, which remains solidly supported on the rails by the locking pins. The suspension in either position of the gate is thus protected from the relatively large forces that are developed by the inertial mass of the gate in response to vertical acceleration of the vehicle, particularly during humping of railroad cars. Such acceleration forces are typically many times larger than the weight of the gate, only a portion of which is carried by spring **64** in locked condition of the gate.

A further illustrative embodiment of the invention is shown somewhat schematically in FIGS. 8, 9 and 10. In that embodiment the gate is swingable about a vertical axis adjacent one edge of the gate, in the general manner that is more fully described in our United States Patent 3,063,388, issued on November 13, 1962. That type of suspension utilizes a vertical squaring shaft **162**, the upper end of which is supported on the upper longitudinal rail structure shown in section at **160**. Rail structure **160** includes a horizontal support surface **163**, which is engaged by an annular face of the thrust bearing **161**, mounted on the upper end of the shaft. A vertical rail flange **164** is provided with sprocket apertures **165**, which correspond generally with apertures **33** of the previously described embodiment, and are engaged by the sprocket teeth of gear **169**, fixed on shaft **160**. The lower end of shaft **162** fixedly carries a similar gear **179** engaging the sprocket apertures **175** in the vertical flange **174** of the lower rail structure **170** secured to the car floor. Shaft **162** is thus freely movable longitudinally of the two rails, and is maintained vertical by the squaring action of the two gears.

The gate **180** is carried on shaft **162** by bearing structures indicated schematically at **181** and **182**, which permit relative rotation and also limited relative axial movement of the gate and shaft. That rotation accommodates swinging of the gate between operating position transversely of the vehicle and idle position against the car wall, indicated at W. It also permits shaft rotation accompanying gate movement longitudinally of the car. The axial gate movement accommodates locking action to be described. When the gate is unlocked the weight of the gate is transmitted to shaft **162** via the bracket **184**, fixedly mounted on the gate frame, and the shaft collar **185**. In accordance with one aspect of the present invention, a load spring **188** acts between bracket **184** and a thrust bearing **189**, carried on collar **185**. That spring supports a portion of the weight of the gate, corresponding generally to spring **64** of the previously described embodiment. Downward movement of the gate may be limited positively by the sleeve **187**, which prevents the spring from being fully compressed. Similar stop means may be provided if desired in the previous embodiment.

Preferred gate locking mechanism comprises locking pins which are typically similar to pins **140** and **136**, already described, in that each has two spaced locking prongs **150** between which is a seating face corresponding to face **152** (FIG. 4). One set of upper and lower pins **140***a* and **136***a* is provided along the suspended edge of the gate, adapted to engage locking apertures **167** in the horizontal flange **166** of the upper rail structure and apertures **172** in lower rail structure **170**, respectively. Another set of upper and lower pins **140***b* and **136***b* is provided at the free edge of the swinging gate, adapted to engage corresponding locking apertures in suitably placed upper and lower rails **161** and **171**. Those rails typically extend along the center of the car if half-width gates are used, or along the opposite side of the car in the case of full-width gates. The several locking pins are typically operated by a single manual level **120***a*, cross shaft **122***a* and crank structures **124***a*, in the manner already described in connection with the previous embodiment. The crank structures are preferably linked positively to the lower locking pins, and are linked to the upper pins by means of lost motion devices and spring means **146***a* corresponding in function to those already described.

Operation and functioning of the locking system of FIGS. 8, 9 and 10 are similar to those of the previously described embodiment. When handle **120***a* is unlatched and swung forward from the face of the gate and downward, lower pins **136***a* and **136***b* are retracted free of the lower rails, lowering the gate until bracket **184** engages the upper end of sleeve **187** and the gate is fully supported upon shaft **162**. That handle movement also positively retracts upper pins **140***a* and **140***b* free of the upper rails, permitting the gate to be rolled along rail surface **163** longitudinally of the car on the flange of thrust bearing **161**. The unlocked gate may also be swung against the car side wall, as indicated in dot-dash lines at **180***a* in FIGS. 9 and 10.

When handle **120***a* is swung upward toward gate locking position, the lower pins are positively extended, entering apertures in the lower rails until the seating surfaces between prongs **150** seat on the rail faces. Further handle movement then positively raises the gate to the position shown in FIG. 8, a definite predetermined portion of the gate weight being supported by spring **188** and the remainder carried directly on the lower rails. That handle movement also releases the upper pins, which are extended by springs **146***a* and enter apertures in the upper rails, the lost motion in the linkages insuring that the pins seat on the rails. When the gate is locked in transverse working position, both prongs **150** of each pin enter locking apertures of the rails, as shown in solid lines in FIGS. 9 and 10. When the gate is locked in idle position against the car side wall, one prong of each pin enters a rail aperture and the other prong projects beyond the rail face adjacent the edge of the rail, as indicated in dot-dash lines in FIGS. 9 and 10. In the present embodiment the prong that is thus external of the rail flange edge lies between two portions of the rail structure in the clearance slot in which shaft **162** operates. With the gate locked in either working or idle position, the supporting shaft is yieldably loaded by spring **188** and thereby prevented from chattering. However, the inertia load of the gate is isolated from the suspension, as in the previous embodiment.

We claim:

1. In a movable load dividing structure for transport vehicles and the like, the combination of

gate structure adapted to form a partition in a compartment,

means for supporting the gate structure for movement between a plurality of positions, said supporting means permitting limited vertical movement of the gate structure,

upper and lower locking formations adapted to be mounted in fixed relation to the compartment at said gate positions,

locking means carried by the gate structure and including at least one pair of upwardly and downwardly projectible locking pins adapted to be projected into locking engagements with respective locking formations,

said locking pins each having a shoulder adapted, respectively, to seat upwardly on one locking formation and to seat downwardly on the other locking formation,

pin operating means carried by the gate structure and movable between gate locking and gate releasing positions,

linkage means acting between said operating means and the downwardly projectible locking pin to force said pin downwardly to seat its shoulder downwardly on said other locking formation and to retract said pin upwardly with relation to the gate structure in re-

sponse to the respective locking and releasing movements of the operating means,

a loading spring seated to press down on the gate and to press said upwardly projectible locking pin upwardly into locking and seated engagement with said one locking formation,

and second linkage means acting between said operating means and said upwardly projectible locking pin to retract that pin downwardly in response to releasing motion of the operating means, said second linkage means including a lost motion which is open when the shoulder of the upwardly projectible locking pin is seated on said one locking formation in the locking position of the operating means to allow said spring to load said pin upwardly to force its seating shoulder upwardly by spring pressure against said one locking formation and by the same spring pressure to press the gate and the shoulder of the lower pin down on said other locking formation.

2. The combination defined in claim 1 and in which downward forcing of the downwardly projectible locking pin with its shoulder seated on said other locking formation raises the gate through its said linkage means and said operating means, and thereby compresses said loading spring when the upwardly projectible locking pin is seated on said one locking formation and said lost motion is open.

3. The combination defined in claim 2 and in which said loading spring is seated directly on said second linkage means to press down on the gate through that linkage means and the operating means carried by the gate.

4. In a movable load dividing structure for transport vehicles and the like, the combination of

gate structure adapted to form a partition in a compartment,

means for supporting the gate structure for movement between a plurality of positions,

locking formation means adapted to be mounted in fixed relation to the compartment at said gate positions,

locking means carried by the gate structure and including at least a pair of oppositely movable locking pins adapted to be moved oppositely relative to each other and to the gate structure into locking engagement with the locking formation means and to be retracted oppositely to such movement relative to each other,

said locking pins each having a shoulder facing in the direction to seat on the locking formation means on relative locking movements of the pins,

pin operating means carried by the gate structure and movable between gate locking and gate releasing positions,

linkage means acting between said operating means and one of the locking pins to force said pin to its locking position and to seat its shoulder on said locking formation means and to retract said pin with relation to the gate structure in response to the respective locking and releasing movements of the operating means,

a loading spring seated to press on the gate in the direction of locking and seating movement of said one locking pin and to press the other locking pin outwardly in the direction of its locking and seating movement into locked and seated engagement with the locking formation means,

and second linkage means acting between said operating means and said other locking pin to retract that pin inwardly in response to releasing movement of the operating means,

said second linkage means including a lost motion which is open when the shoulder of said other pin is seated on the locking formation means in the locking position of said operating means to allow the spring to load said pin outwardly to force its shoulder by spring pressure into seating engagement against the locking formation means and by the same spring pressure to press the gate and the shoulder of said one locking pin in its direction of movement onto the locking formation means.

5. In a movable load dividing structure for transport vehicles and the like, the combination of

gate structure adapted to form a partition in a compartment,

longitudinal rail structure including at least one pair of upper and lower parallel longitudinal rails,

carriage means supported on at least one of said rails and establishing a vertical axis,

said gate structure being mounted to swing horizontally about said axis,

said carriage means carrying at least a part of the weight of the gate structure for limited vertical movement of said structure with reference to said rail,

said upper and lower rails having longitudinally spaced locking formations,

locking means carried by the gate structure and including at least one pair of upwardly and downwardly projectile locking pins adapted to be projected into locking engagements with the locking formations of respectively the upper and lower rails,

said locking pins each having a shoulder adapted, respectively, to seat upwardly on the upper rail and downwardly on the lower rail,

a movable pin operating means carried by the gate structure,

a linkage acting between said operating means and the downwardly projectible locking pin to force said pin downwardly to seat its shoulder on the lower rail and to retract said pin upwardly with relation to the gate structure in response to different movements of the operating means,

a loading spring seated to press down on the gate and to press said upwardly projectible locking pin upwardly into locking and seated engagement with the upper rail,

and a linkage acting between said operating means and said upwardly projectible locking pin and including a lost motion which is open when said linkage acts, in response to the movement of said operating means which forces the lower pin downwardly, to allow said spring to load said pin upwardly and to force its seating shoulder upwardly by spring pressure against said upper rail and by the same spring pressure to press the gate and the shoulder of the lower pin downwardly on said lower rail.

6. In a movable load dividing structure for transport vehicles and the like, the combination of

gate structure adapted to form a partition in a compartment,

longitudinal rail structure including at least one pair of upper and lower parallel longitudinal rails,

means supporting said gate structure on at least one of said rails for swinging movement between a position transverse of said rails and a position substantially parallel to said rails,

said upper and lower rails having horizontally projecting flanges each having a longitudinal series of longitudinally equally spaced locking formations, the longitudinal line of said formations being laterally spaced from the flange edges by a predetermined distance,

locking means carried by the gate structure and including at least one pair of upwardly and downwardly projectible locking pins adapted to be projected into locking engagements with the locking formations of respectively the upper and lower rails,

said locking pins being rotatively fixed to the gate structure to swing with it,

and the projectible end of each locking pin having two projecting prongs spaced by a distance that exceeds said predetermined distance and is an integral multiple of the spacing of said locking formations, said prongs being adapted to engage two spaced locking

formations, said prongs being adapted to engage two spaced locking formations when the gate structure is in transverse position and adapted one prong to engage one locking formation with the other prong external of the rail flange edge when the gate structure is in its position parallel to said rails.

7. In a movable load dividing structure for transport vehicles and the like, the combination of

gate structure adapted to form a partition in a compartment,

means for supporting the gate structure for movement between a plurality of positions, said supporting means permitting limited vertical movement of the gate structure,

upper and lower locking formations adapted to be mounted in fixed relation to the compartment at said gate positions,

locking means carried by the gate structure and including at least one pair of upwardly and downwardly projectible locking pins adapted to be projected into locking engagements with respective locking formations,

at least said downwardly projectible locking pin being shouldered to seat downwardly on one of said locking formations,

pin operating means carried by the gate structure and movable between gate locking and gate releasing positions,

linkage means acting between said operating means and the downwardly projectible locking pin to force said pin downwardly into shouldered seating on said one locking formation and thereby to raise the gate relative to the pin and to retract said pin upwardly with relation to the gate structure in response to the respective locking and releasing movements of the operating means,

means acting to move the upwardly projectible pin upwardly and to retract that pin downwardly in response to locking and releasing movements of the operating means,

said supporting means for the gate structure comprising carriage means movable in the compartment,

structure supporting the gate structure on the carriage means,

said supporting structure including resilient means yieldably supporting at least a portion of the weight of the gate structure on the carriage means when the downwardly projectible pin is projected downwardly and the gate is relatively raised,

said linkage means including a length adjustment between the operating means and said downwardly projectible pin to adjust the distance to which the gate is relatively raised and thereby to adjust the fractional portion of the gate weight supported by the supporting means through said resilient means when said pin is forced downwardly into seating on said one locking formation.

8. In a movable load dividing structure for transport vehicles and the like, the combination of

gate structure adapted to form a partition in a compartment,

means for supporting the gate structure for movement between a plurality of positions, said supporting means permitting limited vertical movement of the gate structure,

locking formation means adapted to be mounted in fixed relation to the compartment at said gate positions,

locking means carried by the gate structure and including at least a downwardly movable locking pin provided with a downwardly facing shoulder and adapted by such downward movement to lockingly engage and to move its shoulder down to seat on said locking formation means,

pin operating means carried by the gate structure and movable between gate locking and gate releasing positions,

linkage means acting between said operating means and said downwardly movable locking pin to force said pin downwardly with relation to the gate structure into locking and shouldered seating engagement with said locking formation means and thereby to raise the gate relative to said pin, and to retract said pin upwardly with relation to the gate structure, in response to respective locking and releasing movements of the operating means,

said gate supporting means including a resilient means yieldably supporting at least a portion of the weight of the gate structure on the supporting means when the downwardly movable pin is shouldered and seated down on the locking formation and the gate is relatively raised,

said linkage means including a length adjustment between the operating means and said downwardly movable pin to adjust the distance to which the gate is relatively raised and thereby to adjust the fractional portion of the gate weight supported by the supporting means through said resilient means when said pin is forced downwardly into seating on said locking formation means.

9. In a movable load dividing structure for transport vehicles and the like, the combination of

gate structure adapted to form a partition in a compartment,

means for supporting the gate structure for movement between a plurality of positions,

locking formation means adapted to be mounted in fixed relation to the compartment at said gate positions,

locking means carried by the gate structure and including at least a pair of oppositely movable locking pins adapted to be moved oppositely relative to each other and to the gate structure into locking engagement with the locking formation means and to be retracted oppositely to such movement relative to each other,

said locking pins each having a shoulder facing in the direction to seat on the locking formation means on relative locking movements of the pins,

pin operating means carried by the gate structure and movable between gate locking and gate releasing positions,

connecting means acting between said operating means and each of the locking pins to move each pin toward its locking position to seat its shoulder on said locking formation means and to retract the pins with relation to the gate structure in response to the respective locking and releasing movements of the operating means,

at least one loading spring seated to press on the gate in the direction of locking and seating movement of one locking pin and to press the other locking pin relative to the gate in the direction of its locking and seating movement into locked and seated engagement with the locking formation means,

at least one of the connecting means which is associated with the said other pin including a lost motion which is open when the shoulder of said other pin is seated on the locking formation means in the locking position of said operating means to allow the spring to load said pin to force its shoulder by spring pressure into seating engagement against the locking formation means and by the same spring pressure to press the gate and the shoulder of said one locking pin in its direction of movement onto the locking formation means.

10. In a movable load dividing structure for transport vehicles and the like, the combination of

gate structure adapted to form a partition in a compartment,

means for supporting the gate structure for movement between a plurality of positions,

locking formation means adapted to be mounted in fixed relation to the compartment at said gate positions,

locking means carried by the gate structure and including at least a pair of oppositely movable locking pins adapted to be moved oppositely relative to each other and to the gate structure into locking engagement with the locking formation means and to be retracted oppositely to such movement relative to each other,

said locking pins each having a shoulder facing in the direction to seat on the locking formation means on relative locking movements of the pins,

pin operating means carried by the gate structure and movable between gate locking and gate releasing positions,

connecting means acting between said operating means and each of the locking pins to move each pin toward its locking position to seat its shoulder on said locking formation means and to retract the pins with relation to the gate structure in response to the respective locking and releasing movements of the operating means,

spring means seated to press on the gate in the direction of locking and seating movement of at least one locking pin and to press at least the other locking pin relative to the gate in the direction of its locking and seating movement into locked and seated engagement with the locking formation means,

and a lost motion in the connection between the operating means and at least said other locking pin which is open when the shoulder of said other pin is seated on the locking formation means in the locking position of said operating means to allow the spring means to load said pin toward its seating position to force its shoulder by spring pressure into seating engagement with the locking formation means.

11. The combination defined in claim **4** and in which the said loading spring is directly seated on said second linkage means.

12. The combination defined in claim **9** and in which the said loading spring is directly seated on said last mentioned connecting means.

13. The combination defined in claim **10** and in which the spring means includes a spring seated directly on the connecting means to said other locking pin and pressing said other locking pin in the direction of its locking and seating movement.

14. The combination defined in claim **1** and in which the said loading spring is directly seated on said second linkage means.

15. The combination defined in claim **5** and in which the said loading spring is directly seated on the last mentioned linkage.

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