July 8, 1930. B. W. KADEL ET AL 1,770,037

SLACK ADJUSTER

Original Filed June 24, 1925 4 Sheets-Sheet 1

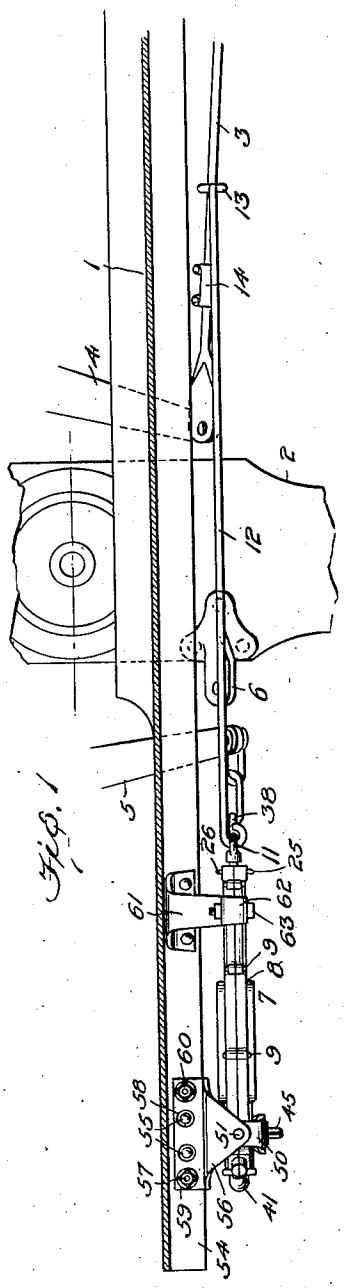


Fig. 1

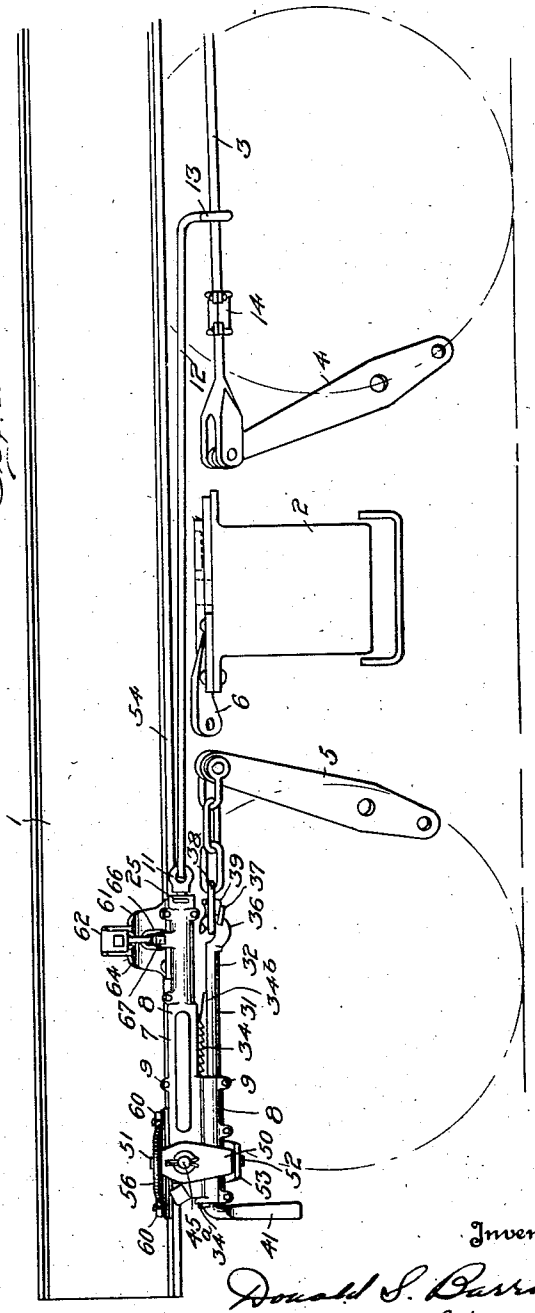


Fig. 2

Inventors
Donald S. Barrows
Byron W. Kadel
By Chas. K. Meeker
Their Attorney

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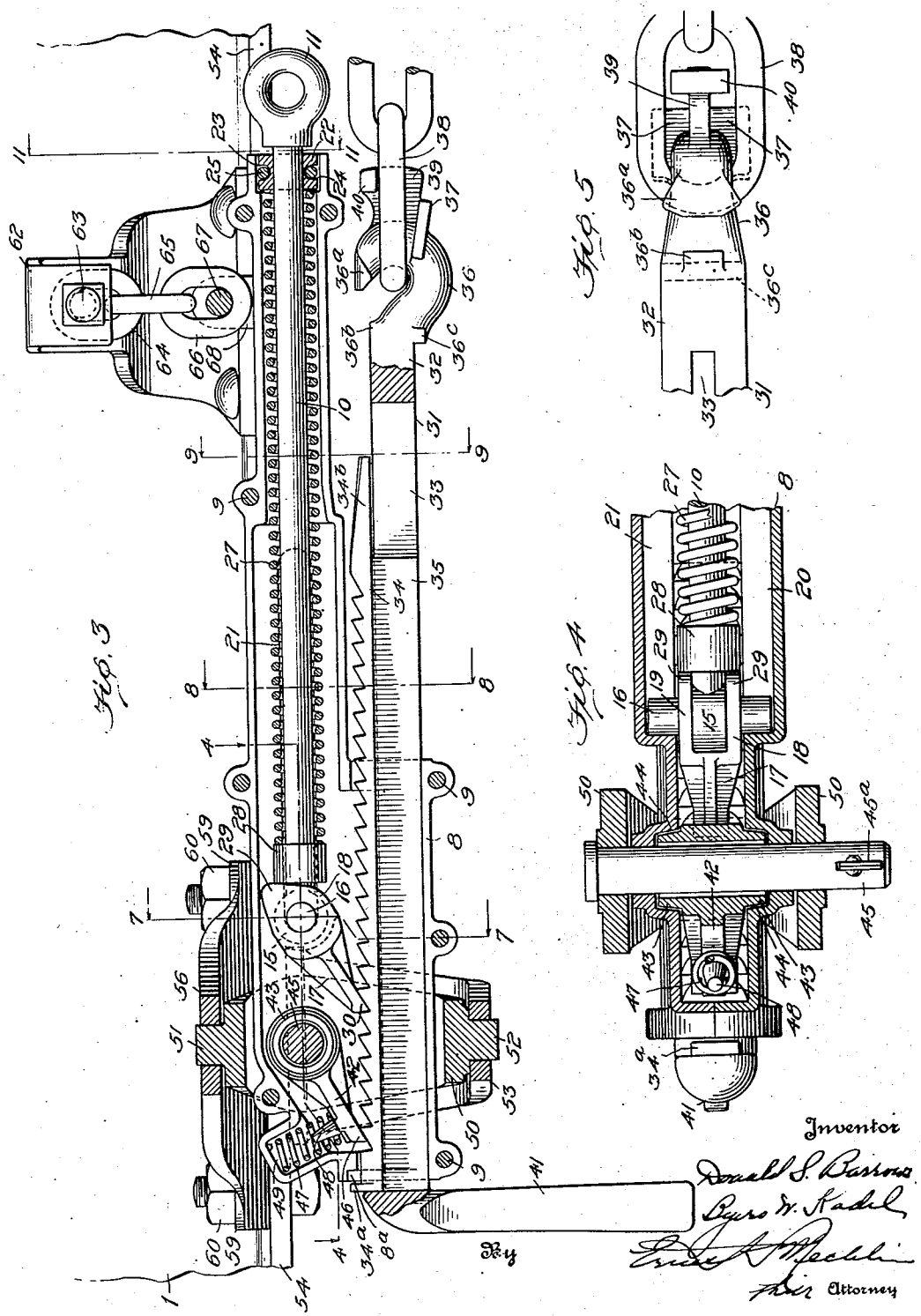


Fig. 3

Fig. 5

Fig. 4

Inventor
Donald S. Barrows
Byron W. Kadel
By Frederick Machlin
Their Attorney

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SLACK ADJUSTER

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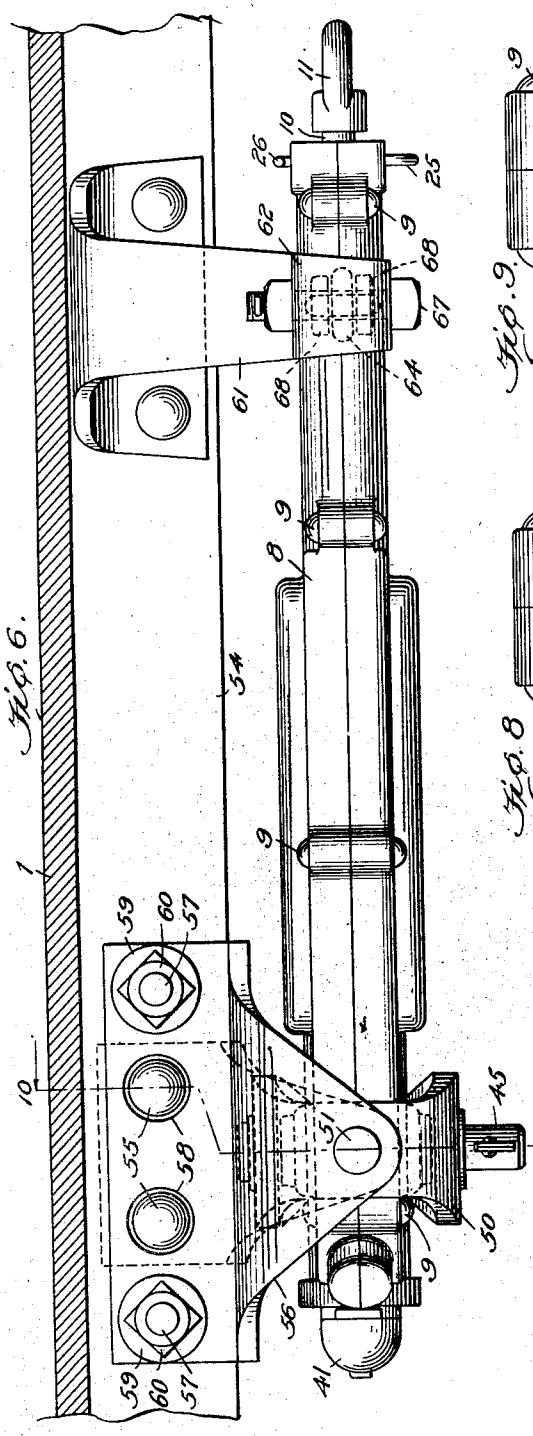


Fig. 6.

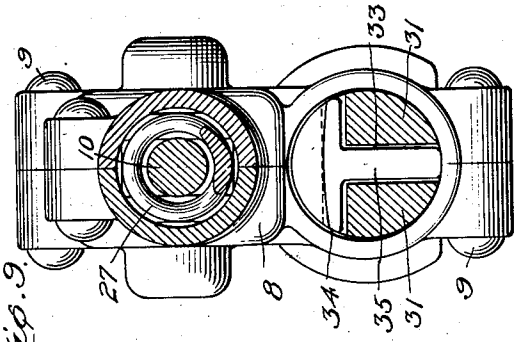


Fig. 9.

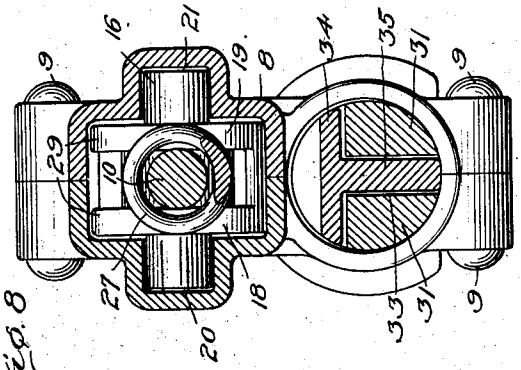


Fig. 8

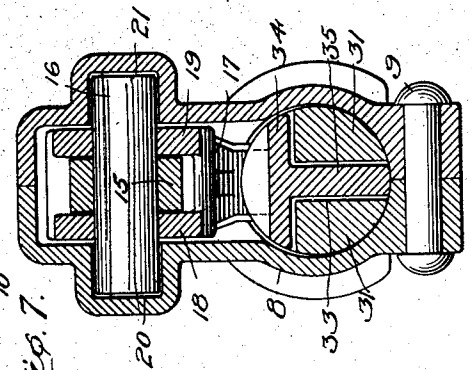


Fig. 7.

Inventor

Donald S. Barrows

Cyrus W. Kadel

By Thurston McLachlin

Their Attorney

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Fig. 10

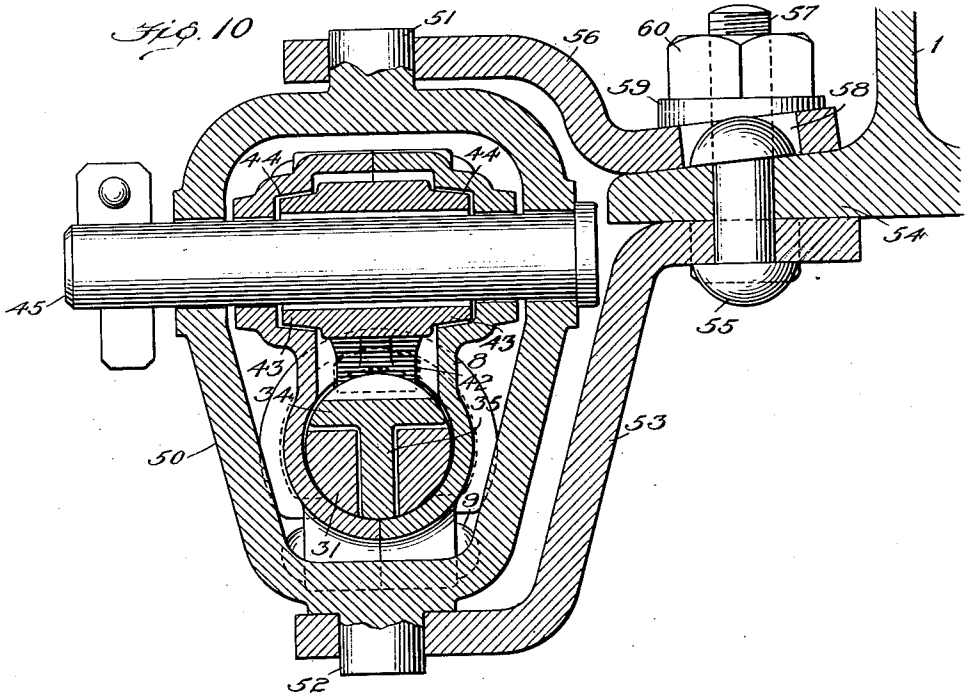
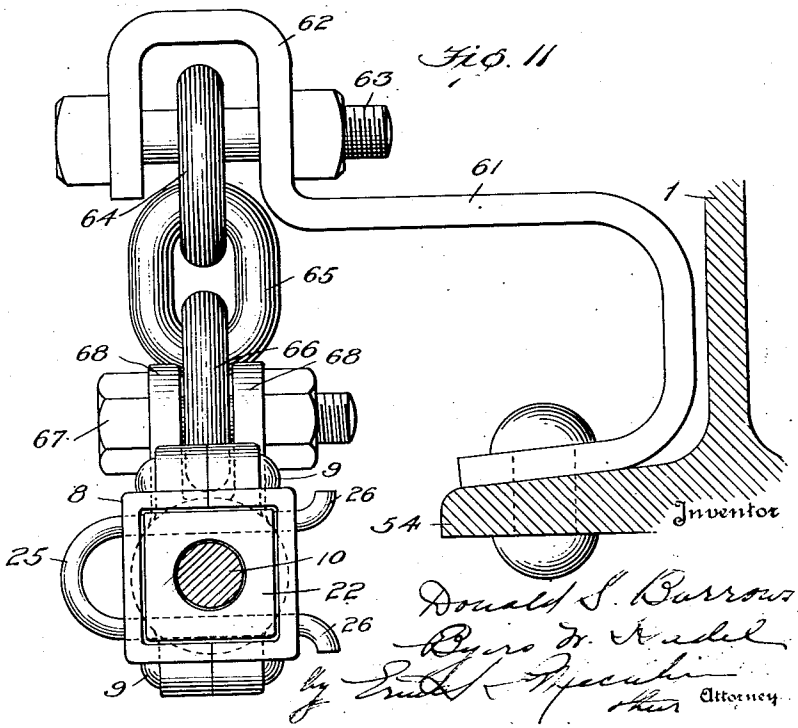


Fig. 11



Inventor

Donald S. Barrows

Byron W. Kadel

by Rudolf Hyscuhin

Attorney

Patented July 8, 1930 1,770,037

UNITED STATES PATENT OFFICE

BYERS W. KADEL, OF BALTIMORE, MARYLAND, AND DONALD S. BARROWS, OF ROCHESTER, NEW YORK, ASSIGNORS TO THE SYMINGTON COMPANY, OF NEW YORK, N. Y., A CORPORATION OF MARYLAND

SLACK ADJUSTER

Application filed June 24, 1925, Serial No. 39,348. Renewed February 17, 1930.

This invention relates to automatic slack adjusters and particularly those adapted for attachment to the car body.

The principal object of our invention, generally considered, is the provision of an improved slack adjuster for railway car brake rigging which is so arranged as to permit free angling thereof with respect to the car body without deleteriously affecting the operation thereof, to permit said adjuster to be readily disconnected from the brake rigging, to be readily released when desired, which is formed to avoid injurious results from tampering with the mechanism, and which involves other improved features.

An object of our invention is the provision of a slack adjuster for railway brake rigging in which the main support for said device provides a full universal connection between it and the car body as well as permitting attachment and detachment with respect to said car body in a quick and efficient manner without sacrificing the security of said connection.

Another object of our invention is the provision of an improved slack adjuster for railway cars in which the front pawl or locking dog is pivotally connected directly with the slack adjuster housing rather than on the pin passing through said dog and supporting the housing, whereby the forces applied to said pin do not affect the operation of the locking dog.

Another object of our invention is the provision of an improved form of support for slack adjusters, which support comprises a resilient plate riveted to a portion of the car body and releasably connected to a chain which is similarly connected to the housing of the slack adjuster whereby said adjuster is suspended from the car body so that the necessary angling therebetween is permitted and said adjuster may be easily and freely connected to and detached from said car body.

A further object of our invention is the provision of an improved take-up rod pawl which is pivoted with respect to the take-up rod by a substantially horizontal pin which also serves to guide one end of said take-up rod in the slack adjuster housing.

A still further object of our invention is the provision of an improved bearing for slidably supporting one end of the take-up rod of the slack adjuster, said bearing being formed separate from the housing and adapted for ready connection and disconnection with respect thereto, said connecting means preferably taking the form of a cotter extending along grooves in the bearing and through perforations in the housing.

An additional object of our invention is the provision of a rack bar for slack adjusters, said rack bar being provided with a handle for the manual operation thereof and a rack element slidably mounted with respect thereto whereby the device is rendered more foolproof, and other desirable functions are obtained, the end of said rack bar opposite to the handle being provided with a special form of hook adapted for connection with the dead lever by a link or chain, a connecting link in locking relation with respect to the hook being prevented from undesired release by virtue of a plurality of movements in different directions being necessary to effect such unlocking.

Other objects and advantages of the invention, relating to the particular arrangement and combination of parts, will become apparent as the description proceeds.

Referring to the drawings illustrating our invention, the scope whereof is defined by the claims:

Figure 1 is a plan view, partly in section, showing a slack adjuster embodying our invention connected to the underframe of a car, which underframe, as well as the truck bolster of the car, are shown only fragmentarily.

Figure 2 is a side elevation of the slack adjuster and parts of the car illustrated in Figure 1.

Figure 3 is an enlarged elevational view of the slack adjuster shown in Figure 2, certain of the parts thereof being shown in section.

Figure 4 is a horizontal sectional view on the line 4—4 of Figure 3, looking in the direction of the arrows.

Figure 5 is a plan view of the rack bar locking hook and link connection thereto.

Figure 6 is an enlarged plan view of our slack adjuster.

Figures 7, 8 and 9 are vertical sectional views on the correspondingly numbered lines of Figure 3, looking in the direction of the arrows.

Figure 10 is a vertical sectional view on the line 10—10 of Figure 6, looking in the direction of the arrows.

Figure 11 is a vertical sectional view on the line 11—11 of Figure 3, looking in the direction of the arrows.

Referring to the drawings in detail, similar parts being designated by like reference characters, there is indicated a portion of the car underframe, such as one of the center sills 1 thereof, and one of the truck bolsters 2, shown particularly in Figures 1 and 2.

The car may be provided with the usual pull rod 3 connected to the live lever 4. As will be understood, the fulcrums of the live and dead levers 4 and 5 are adapted for connection in the usual manner with the brake beams carrying their respective brake shoes, and as such features are not part of the invention, they are not further illustrated. The corresponding ends of the live and dead levers 4 and 5, respectively, are adapted for connection by means of a usual form of bottom rod, as will be understood. A dead lever fulcrum 6, attached to the bolster 2, is illustrated but in employing the slack adjuster according to our invention, the necessity for such a fulcrum is dispensed with.

Our improved form of slack adjuster is represented generally by the reference character 7 and comprises a housing 8 formed as two complementary halves preferably connected together by a plurality of rivets or bolts 9. In said housing there is slidably mounted the take-up rod 10, the outer or rear portion of which is provided with an eye 11 for connection with a link or operating rod 12. Said eye 11 may be suitably connected to the rod 10 as by being threaded thereto. The rear end of the operating rod 12 is provided with an eye or collar 13 slidably mounted on the pull rod 3 and adapted for actuation by said pull rod, upon abnormal or excess movement thereof, by engagement of an adjustable collar 14 preferably bolted on said pull rod 3.

The take-up rod 10, at its inner, or front end with respect to the car, is formed with a preferably integral eye portion 15 through which passes a pivotal and supporting pin 16. Said pin 16 serves to pivotally connect the take-up pawl 17 with the take-up rod 10. Said pawl 17 is preferably bifurcated at the hub portion thereof, forming upright flanges 18 and 19 embracing the eye or apertured portion 15 of the take-up rod 10.

The pin 16 is passed through the flange 18, the eye 15 and the flange 19, the ends of said pin sliding and being supported in longitudinal grooves 20 and 21 formed on the interior of the housing 8. These grooves guide and support the ends of the pin 16 and, through said pin 16, support and guide the corresponding end of the take-up rod 10, and preferably terminate intermediate the ends of the housing to limit the movement of the pin and rod. The other end of the take-up rod 10 is slidably supported by means of a bearing 22, which bearing is preferably readily replaceable with respect to the housing 8 and, in the present instance, is formed as a rectangular substantially square block perforated for receiving the take-up rod 10 and grooved at 23 and 24, along a pair of opposite sides thereof, for the reception of a locking cotter 25. Said cotter 25 is insertible through apertures registering with the grooves 23 and 24 in the bearing 22 and after insertion of said cotter the free ends 26 thereof may be bent, as illustrated particularly in Figure 11, to prevent undesired removal thereof. As will be understood, the end of the housing 8 may be suitably cut out or enlarged to receive the bearing portion 22, as illustrated particularly in Figure 3, and provide shoulders against which the inner edges thereof abut. In this manner the bearing block 22 is releasably yet securely held in place and prevented from undesired removal yet provision is made for readily replacing the same should it become worn in service.

Between the bearing block 22 and the take-up pawl 17, there is provided a helical spring 27, said spring serving to move the take-up rod toward the left, as shown in Figure 3, after the same has been actuated to the right and then released. One end of said spring 27 engages the bearing 22 and the other end preferably engages a slidable follower 28, preferably in the form of a relatively long sleeve closely fitting yet freely slidable on the take-up rod, and urges the same against the pawl 17 and particularly the rearward cam-shaped extensions 29 therefrom. It will be apparent that as the follower 28 engages the extensions 29 from the pawl 17, the spring pressure will urge the operating end 30 of said pawl into engagement with the rack or ratchet bar 31.

The ratchet bar 31, in the present embodiment, is formed generally cylindrical, as at 32, and bifurcated or slotted along an intermediate portion thereof, at 33, and slidably embraces a ratchet or rack portion 34, and more particularly a depending flange portion 35 thereof. The lower edge or surface of the depending flange 35 from the ratchet 34, as well as the lower surface on the cylindrical portion 32 of the rack bar 31, bears on the lower wall of the housing 8, as illustrated particularly in Figure 3, a certain amount of clearance being preferably provided between the adjacent horizontal surfaces on the rack 34 and the cylindrical portion 32 of the rack

bar, as illustrated particularly in Figures 7 8 and 9. The front portion of the rack 34 is provided with a lip portion 34ª, adapted for engagement with a cooperating pocket 8ª in the housing, to limit the rearward movement thereof. The rear portion of said rack may be tapered or beveled, or provided with such an extension as indicated at 34ᵇ, to facilitate assembly.

As will be appreciated from an inspection of Figures 7, 8, 9 and 10 particularly, the rack portion 34 is generally T-shape in cross-section with a depending flange 35 engaged in the bifurcated portion 33 of the rack bar 31. One end of said rack bar is formed, with a connecting means preferably hook-shape, as illustrated, whereby the same is operatively connected to the dead lever 5, as illustrated particularly in Figures 1 and 2.

The hook portion 36 of the rack bar 21 is preferably formed to open upwardly, as illustrated, and provided with a shoe portion 37 adapted to normally underlie the adjacent link 38 and prevent it dropping materially from an approximately horizontal position. Extending longitudinally and outwardly from the hook 36 is a web or flange portion 39 which normally extends between the sides of the link 38 and is provided with stop portions 40 normally extending to both sides above the level of said link. The point 36ª of the hook 36 is preferably flared to its end to a dimension greater than the width of the link openings and the stem portion provided with a lug 36ᵇ to prevent accidental or undesired disengagement between the hook and link. On account of this construction, the link 38 cannot be removed from the hook 36 without rotating its first counter-clockwise around a substantially horizontal axis and then one way or the other about an axis angularly disposed with respect to the first axis. The other end of the rack bar 31 is provided with an operating handle 41, said handle preferably normally depending and adapted for either horizontal or rotary movement.

On account of the difference in length between the bifurcated portion 33 of the track bar 31 and the rack 34, the operating handle 41 may be moved a substantial distance longitudinally, which distance may correspond with the minimum brake piston travel to be maintained, without having any effect upon the rack proper 34. The object of such a construction is to prevent injurious effect resulting from unauthorized persons tampering with or manipulating the operating lever 41, it being obvious that on account of the lost motion provided, a desired amount of travel is maintained even though the adjuster is manually tightened by pulling out the lever 41 to the full extent. However, upon closing up the distance between the right hand ends of the bifurcated portion 35 and the rack 34 by sufficient movement of the lever 41, the rack may be manually moved the requisite distance to the left if desired.

If at any time it is desired to entirely release the rack from the take-up pawl 17 and the locking dog 42, said handle 41 may be rotated through approximately 90° about the rack bar 31 as an axis when the rack 34 will be thrown out of engagement with the pawl 17 and dog 42 and the rack bar 31 may then be entirely released with respect thereto. The hook 36 may be provided with an abutment or stop portion 36ᶜ adapted to abut the adjacent portion of the lower wall of the housing 8 to limit the movement thereof to the left, as illustrated particularly in Figure 3. The construction of the locking dog or pawl 42 involves novel and desirable features such as the pivotal connection between the trunnion or hub portions 43 thereof and corresponding bearing or pocket portions 44 formed in the housing sections 8.

Although a pivot pin 45 extends entirely through the hub of the locking pawl 42, yet the clearance with respect to said pin is so great that it does not frictionally engage therewith but rather with the bearing portions 44 on the housing. In this way the pivot pin 45, which serves to pivotally support the housing, does not influence the action of the pawl 42 because of the weight imposed thereon from the housing. One end of the pin 45 may be headed and the other end prevented from undesired removal by any suitable locking device, such as the cotter 45ª illustrated.

The operative end 46 of the locking pawl 42 is pressed into engagement with the rack 34 by means of a helical spring 47, said spring preferably surrounding, at its lower end, an extension 48 from the pawl and being housed at its upper end, in a pocket 49 in the housing 8.

The pivot pin 45 serves to support the housing 8 and the contained members of the slack adjuster by extending through apertures in said housing and registering apertures in a frame 50, said frame or ring entirely encircling one end of the housing 8 and being provided at its upper and lower ends, respectively, with substantially vertical or upright trunnion portions 51 and 52. The lower trunnion 52 is adapted for being supported by a bracket or anchorage 53 preferably extending from and connected to the lower edge of the outstanding flange 54 of the center sill 1 by a plurality of rivets 55. In the preferred embodiment there are two rivets 55 spaced relatively close, as illustrated in Figure 6. The upper trunnion 51 is pivotally supported by means of the bracket or anchorage 56 preferably extending from and bolted to the upper surface of the flange 54.

In the present embodiment two bolts 57 are employed spaced relatively far apart, as illustrated in Figure 6, and outwardly of the

rivets 55, that portion of the bracket 56 adjacent the heads of rivets 55 being cut away or provided with clearance holes, as illustrated at 58. A tapered washer 59 may be employed with each nut 60 on the bolts 57, on account of the angular relationship between the upper and lower surfaces on the flange 54 of the center sill 1. By virtue of this construction the lower bracket 53 is securely attached to the center sill and not readily removed therefrom, whereas the upper bracket 56 is adapted for ready removal by merely removing the bolts 57 so that the slack adjuster may be detached from the car when desired. On account of the bracket 56 being cut away at 58 adjacent the heads of the rivets 55, there is no interference between said bracket 56 and the rivets 55.

On account of this form of support between the slack adjuster housing and the car underframe, a full universal connection is provided as horizontal angling is permitted between the frame 50 and the brackets 53 and 56, whereas vertical angling is permitted between the housing 8 and the frame. The other end of the housing 8 is preferably supported for permitting relative motion between said housing and underframe, said support, in the present embodiment, taking the form of a flexible or resilient plate 61 riveted to the flange 54 of the center sill 1 and extending upwardly and outwardly with a U-shaped outer portion 62. Said portion 62 is preferably perforated for the reception of a bolt or other removable securing means 63, said bolt having attached thereto a link 64 of a chain or other flexible securing means 65.

The lower end of said securing means 65, or the lower link 66 thereof, is preferably connected to the housing 8 by a bolt or the like 67 extending through said link 66 and perforated upstanding flange portions 68 from the housing 8. Although, if desired, a form of suspension allowing more resiliency between the housing 8 and the flange 54 may be provided, yet with the present support a reasonable amount of spring action without damage is obtainable.

The operation of the aforedescribed slack adjuster is as follows:

When the brake shoes are new so that a normal amount of piston travel only is necessary to set the brakes, the pull rod 3 moves during the normal operation of the brakes, a distance sufficient to cause engagement between the collar 14 and the encircling eye portion 13 of the connecting rod 12. When the brake shoes become worn to such an extent that it is necessary to move the pull rod an abnormal amount to apply the brakes sufficiently, an engagement is effected between the collar 14 and the encircling eye portion 13, causing the take-up rod 10 to be drawn to the right a distance corresponding to this excess motion. Such motion, if greater than the length of one of the teeth of rack 34, will cause the pawl 17 to slide over one or more of said teeth, the engagement of locking pawl or dog preventing said rack from being drawn to the right with the pawl 17. Upon release of the brakes the take-up rod 10 is likewise released and the spring 27 forces said take-up rod back to its normal position, illustrated in Figure 3, and on account of the engagement between the pawl 17 and the rack 34, a movement to the left of the rack 34 and rack bar 32, corresponding to the tooth or number of teeth over which pawl 17 has slipped when the brakes were applied, is effected. This movement of the rack bar 32 to the left draws the corresponding end of the dead lever 5 to the left and, through the connection between the dead and live levers, effects a corresponding movement at the end of the live lever 4 connected to the pull rod 3 so that until further wear of the brake shoes has taken place, no further engagement is effected between the collar 14 and the connecting rod 12, sufficient to slip the pawl 17 past any more teeth of the rack 34.

As will be obvious, when the rack 34 has been moved to the left by means of the take-up rod 10, it will be locked in place by means of the locking dog or pawl 42.

In view of the aforesaid construction, it will be apparent that we have devised an improved form of automatic slack adjuster in which angling is freely permitted between the same and the car body or underframe in which the bearings for the take-up rod are advantageously arranged and constructed, the rack bar being constructed of a plurality of parts for safety and convenience of operation and the connection between said rack bar and the dead lever being so effected that undesired release is prevented, whereas a ready release thereof may be effected when desired.

Having described our invention, we claim:

1. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and including two relatively movable members operatively associated, respectively, with said live lever and dead lever, a housing for said relatively movable members and a support for said housing comprising bracket portions connected to the car body, a frame provided with upright trunnions pivotally supported by said bracket portions and a substantially horizontal pin extending through said frame and housing for supporting the latter, while permitting angling thereof.

2. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and including two relatively movable members operatively associated, respectively, with said live lever and dead lever, a housing for said relatively mov-

able members and a support for said housing comprising upper and lower brackets, said lower bracket being riveted to the underside of the car body, said upper bracket being bolted to the upper side of the same member and having apertures therein to take the upper heads of the lower bracket connecting rivets and an articulated connection between said brackets and the housing.

3. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and including two relatively movable members operatively associated, respectively, with said live lever and dead lever, a housing for said relatively movable members and a support for said housing comprising a resilient bracket connected to the car body and provided with an apertured inverted U-shaped portion adjacent its outer end, and a chain connected to the housing and attached to the U-shaped portion of the bracket by detachable means extending through the apertures in the U-shaped portion and a link of the chain.

4. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and including two relatively movable members operatively associated, respectively, with said live lever and dead lever, a housing for said relatively movable members and a support for said housing comprising a universal connection between each end thereof and the car body.

5. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and including two relatively movable members operatively associated, respectively, with said live lever and dead lever, a housing for said relatively movable members and a support for said housing comprising a pivotal connection allowing angling in all directions at one end thereof, and a yielding flexible connection at the other end, whereby said housing can adjust itself with respect to relative movement of the car body and trucks.

6. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and comprising a rack bar operatively connected to the dead lever, a take-up rod operatively connected to the live lever and slidable in one direction upon excess movement of said live lever, a dog in operative engagement with the rack bar to prevent movement thereof in the same direction and permit free movement thereof in the opposite direction, a spring to slide the take-up rod in the reverse direction, a housing for said slack adjuster, said dog being provided with hollow trunnions pivotally mounted in the housing, and pivotal supporting means for said housing passing through the hollow trunnions on the dog, but spaced with respect thereto.

7. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and comprising a rack bar operatively connected to the dead lever, a take-up rod operatively connected to the live lever, and slidable in one direction upon excess movement of said live lever, a dog in operative engagement with the rack bar to prevent movement thereof in the same direction and permit free movement thereof in the opposite direction, a housing for said slack adjuster, said dog being provided with axially perforated trunnions pivotally mounted in the housing, a support for said housing comprising bracket portions connected to the car body, a frame provided with upright trunnions pivotally supported by said bracket portions, and a substantially horizontal pivotal member extending through said frame, housing and the perforated trunnions for supporting the housing but free from frictional engagement with the adjacent portions of the trunnions.

8. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and comprising a rack bar operatively connected to the dead lever, a take-up rod operatively connected to the live lever and slidable in one direction upon excess movement of said live lever, a dog in operative engagement with the rack bar to prevent movement thereof in the same direction and permit free movement thereof in the opposite direction, a housing for said device, a bearing for one end of the take-up rod comprising an angular block mounted in said housing and in which said take-up rod is slidably embraced, said block being grooved along a pair of opposite sides and held in said housing by a cotter engaging said grooves and extending through corresponding apertures in the housing.

9. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and comprising a rack bar operatively connected to the dead lever, a take-up rod operatively connected to the live lever and slidable in one direction upon excess movement of said live lever, a dog in operative engagement with the rack bar to prevent movement thereof in the same direction and permit free movement thereof in the opposite direction, said rack bar being provided with a rack portion movable to a limited extent with respect thereto.

10. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and comprising rack bar operatively connected to the dead lever, a take-up rod operatively connected to the live lever and slidable in one direction upon excess movement of said live lever, a dog in operative engagement with the rack bar to prevent movement thereof in the same direction and permit free movement thereof in the opposite direction, said rack bar being bifurcated for a portion of its length and slidably embracing at said bifurcated portion, a de-

pending flange, of a rack, the end of said bar opposite its connection with the dead lever being provided with a handle for manually operating the same, said bar being normally slidable away from said dead lever a substantial distance independent of the rack.

11. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and comprising a rack bar operatively connected to the dead lever, a take-up rod operatively connected to the live lever and slidable in one direction upon excess movement of said live lever, a dog in operative engagement with the rack bar to prevent movement thereof in the same direction and permit free movement thereof in the opposite direction, said rack bar being bifurcated for a portion of its length and slidably embracing at said bifurcated portion, a depending flange of a rack, the end of said bar opposite its connection with the dead lever being provided with a handle for manually operating the same, said bar being normally slidable away from said dead lever a substantial distance independent of the rack, and being released from the dog and take-up rod by rotating the same.

12. In combination, a live lever, a dead lever, an automatic slack adjuster mounted on a car body and comprising a housing, a rack bar movable therein and operatively connected to the dead lever, a take-up rod operatively connected to the live lever and slidable in one direction upon excess movement of said live lever, a dog in operative engagement with the rack bar to prevent movement thereof in the same direction and permit free movement thereof in the opposite direction, said rack bar being provided with a rack portion movable to a limited extent with respect thereto and provided with a lip portion for limiting the movement between it and the housing.

13. A slack adjuster comprising a housing, a rack bar slidable therein, said bar being bifurcated intermediate its ends and slidably embracing a rack proper, one end of said rack proper being provided with a lip portion extending therefrom for engagement with the housing, to limit rack movement in one direction.

14. A universal support for a slack adjuster comprising bracket portions adapted for connection to the car body, a frame provided with an inner and a lower upright trunnion, one of said trunnions pivotally supported in one of the bracket portions and the other pivotally supported in the other bracket portion, and a substantially horizontal pin extending through said frame and adapted to pivotally support a slack adjuster whereby the same is capable of universal angling motion.

15. A support for slack adjusters comprising upper and lower brackets, said lower bracket being formed for riveting to the underside of a member of the car body, said upper bracket being adapted for bolting to the upper side of the same member and formed with apertures therein to take the upper heads of the lower bracket connecting rivets, a frame pivotally connected with respect to said brackets, and pivotal means at an angle to the pivotal connection between the frame and brackets for supporting a slack adjuster within the frame.

16. A take-up rack comprising a rack bar bifurcated for a portion of its length intermediate its ends and slidably embracing, at said bifurcated portion, a depending flange of a rack proper, the end of said rack bar being provided with a handle for manually operating the same and said bar being normally slidable in one direction a substantial distance independent of the rack and normally movable with the rack in the other direction.

17. In combination, a dead lever, a slack adjuster mounted on a car body and comprising a rack bar operatively connected to the dead lever, a dog in operative engagement with the rack bar to prevent movement thereof in one direction and permit free movement in the opposite direction, said rack bar involving a rack portion movable to a limited extent with respect thereto, and a lever connected to said rack bar for manually adjusting said rack portion.

18. In combination, a dead lever, a slack adjuster mounted on a car body and comprising a rack bar operatively connected to the dead lever, said rack bar being slotted for a portion of its length and slidably embracing in said slotted portion a depending flange of a rack, said flange being of such a length that a predetermined amount of lost motion is provided between it and the rack bar, the end of said bar opposite its connection with the dead lever being provided with a handle for manually operating the same, and a dog in operative engagement with said rack for holding the same in adjusted position.

19. A slack adjuster comprising a pair of members one of which is connected to the car body and the other to the dead lever, said members being relatively movable and a lost motion connection being provided therebetween, whereby relative movement of said members beyond the amount of lost motion is necessary to provide a slack adjustment.

20. In combination, a car body, a slack adjuster wholly mounted on said car body and comprising a movable element and a fixed element, a dead lever connected to said movable element, a dog adapted to lock said elements against relative movement in one direction, and means carried by one of said elements for permitting a limited relative movement of said movable element in the op-

posite direction without disengaging said dog.

21. A connector for the top of a truck dead lever, adapted for anchoring the same to a fixed portion of the car body above the truck, comprising a section adapted for connection to the dead lever and another section adapted for connection to the car body, said sections being susceptible of movement with respect to each other, ratchet mechanism introduced between said sections in a manner to hold the same against relative movement in the direction of the force resulting from an application of the brakes and to permit relative movement in the opposite direction, lost motion being provided for in said mechanism to maintain a desired minimum brake shoe travel, said mechanism being operable to hold the said sections in their new relative positions after a preliminary movement to take up the lost motion.

22. A slack adjuster for the foundation brakes of freight cars comprising a member adapted to connect the top of the dead lever with a portion of the car body above the truck, said member comprising truck lever connected and car body connected portions relatively movable in slack adjusting direction, and a dog mechanism operatively interposed between said portions to hold them against relative movement in the direction of force of an application of the brakes while provided with lost motion corresponding with a desired minimum brake shoe clearance and permitting relative movement in the opposite direction, said dog mechanism being operable after taking up the lost motion to hold said portions in a new relationship.

In testimony whereof, we affix our signatures.

BYERS W. KADEL.
DONALD S. BARROWS.