May 3, 1966 H. R. BILLETER 3,249,183

DOUBLE ACTING SLACK ADJUSTERS

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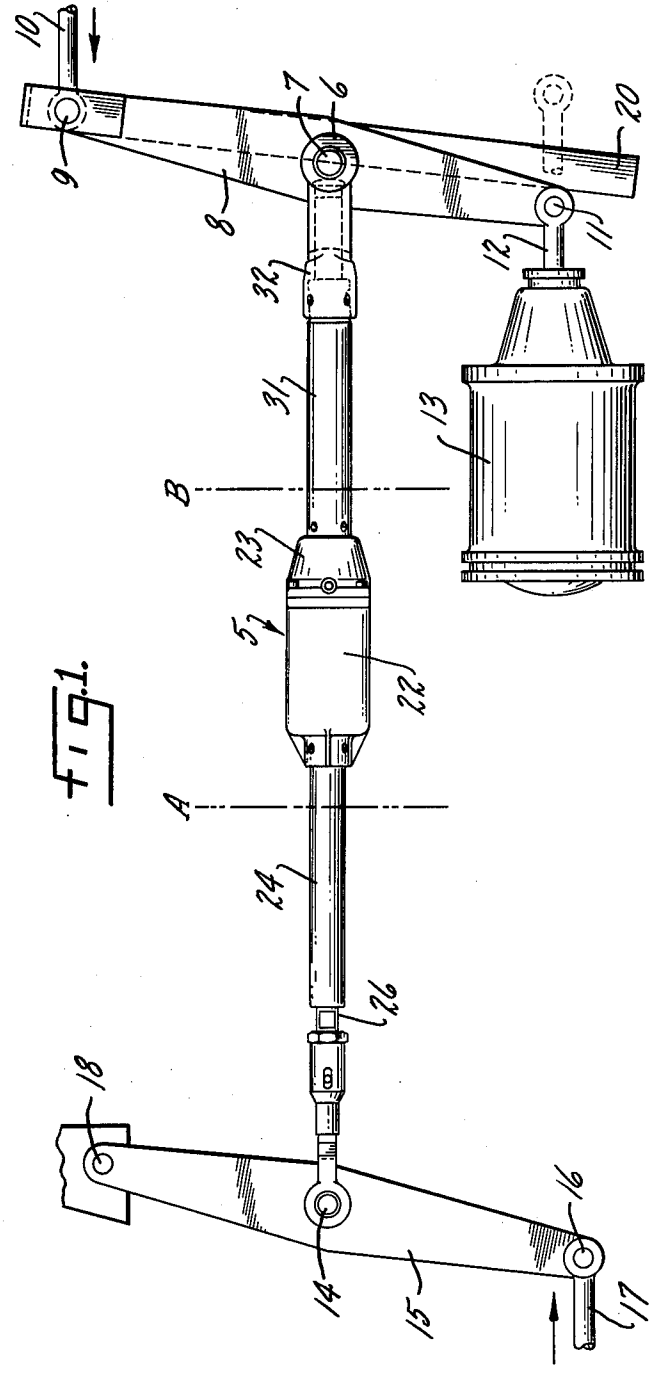


FIG. 1.

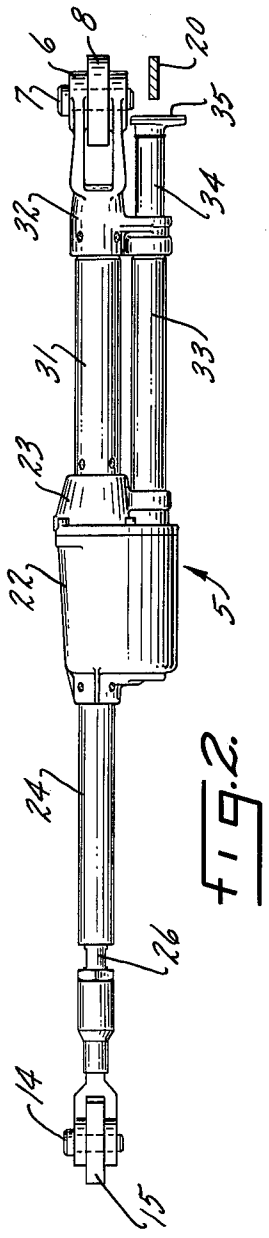


FIG. 2.

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FIG. 6.

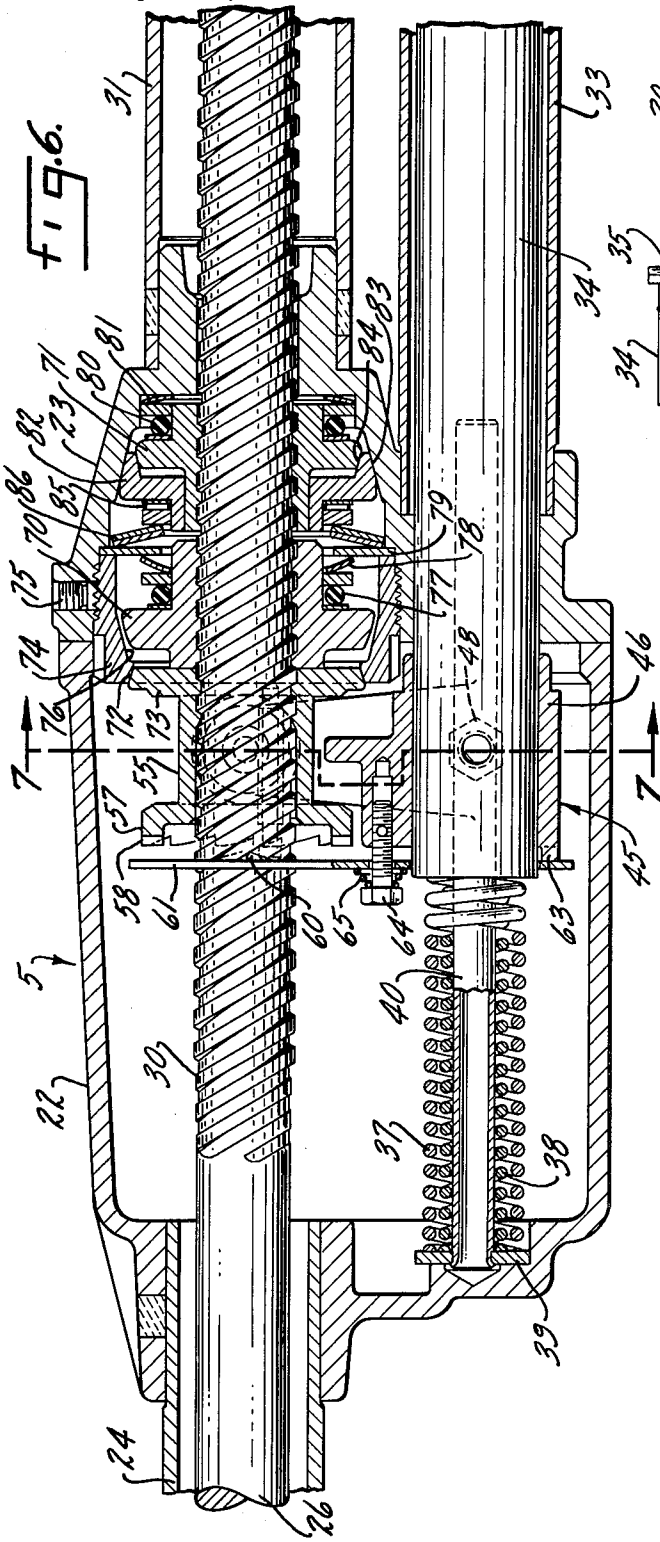


FIG. 11.

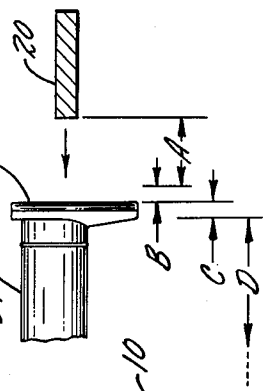
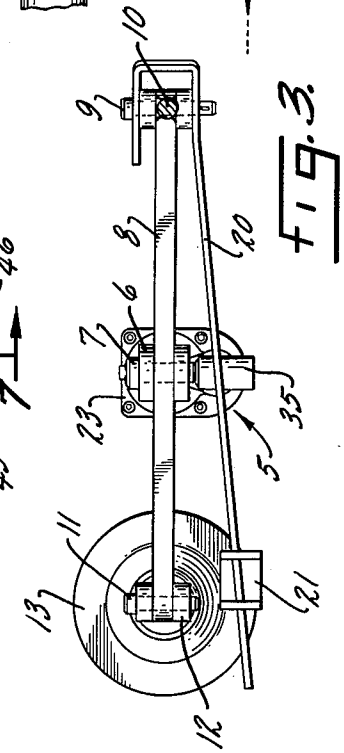


FIG. 3.



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DOUBLE ACTING SLACK ADJUSTERS

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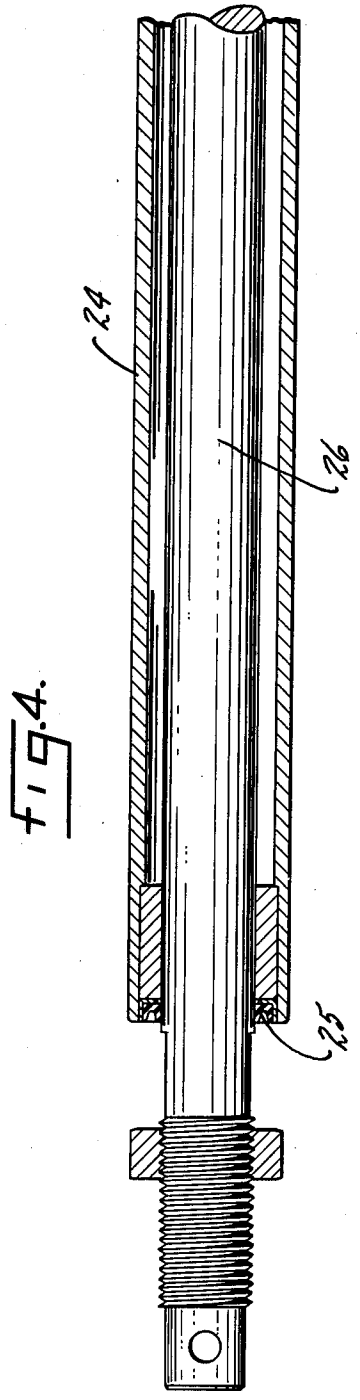


FIG. 4.

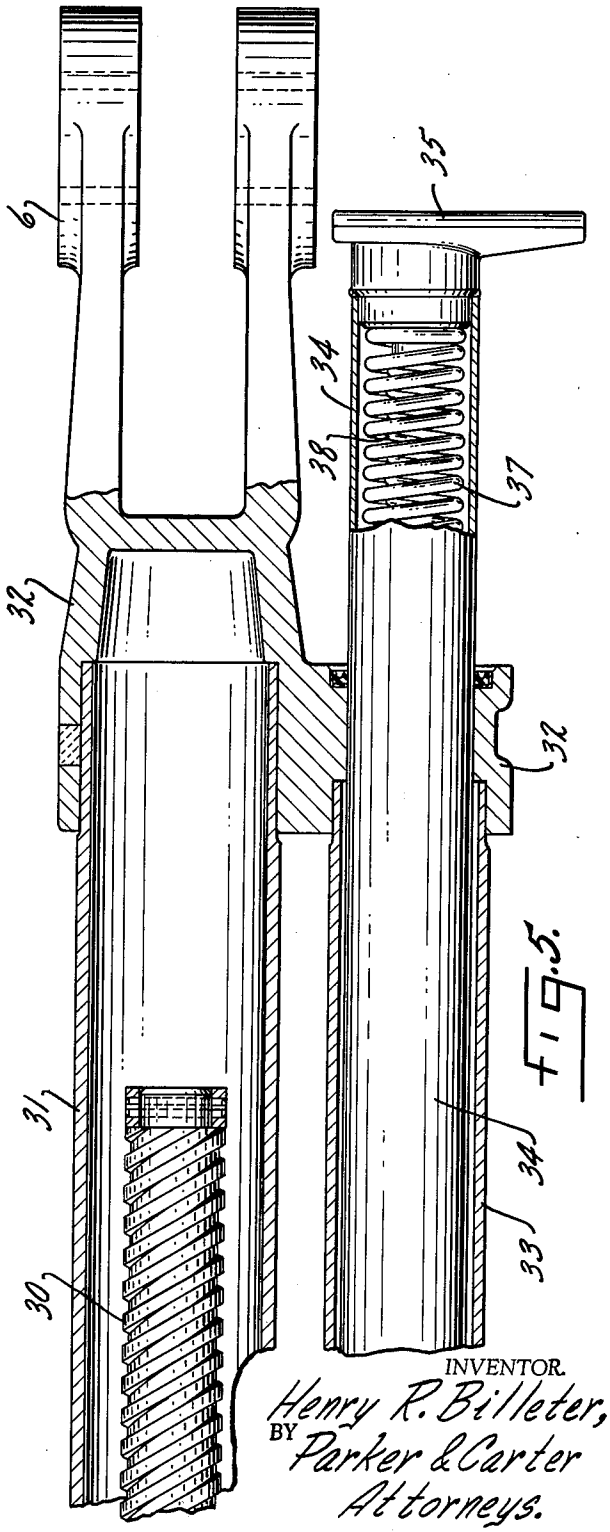


FIG. 5.

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DOUBLE ACTING SLACK ADJUSTERS

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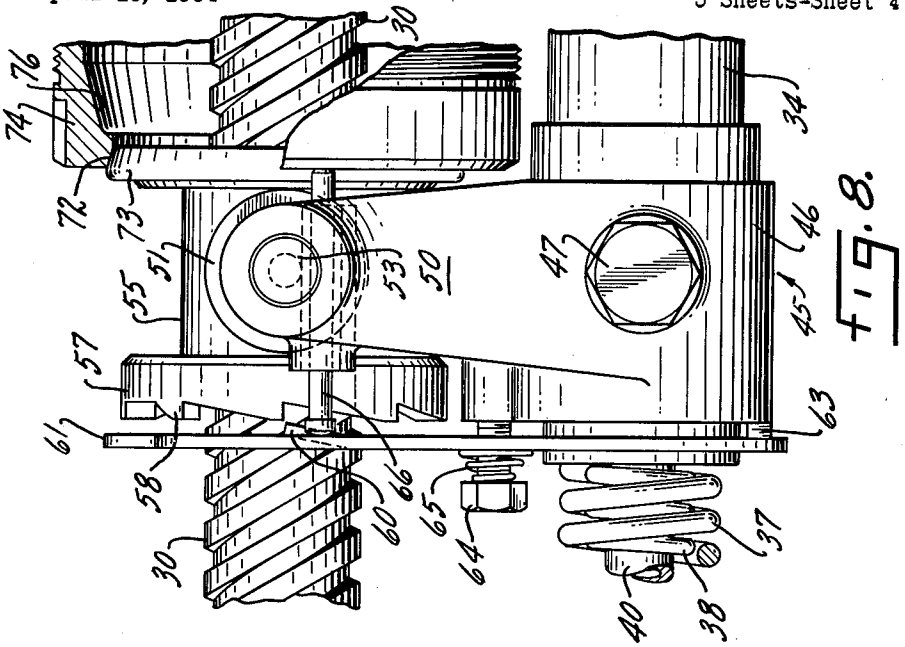


FIG. 8.

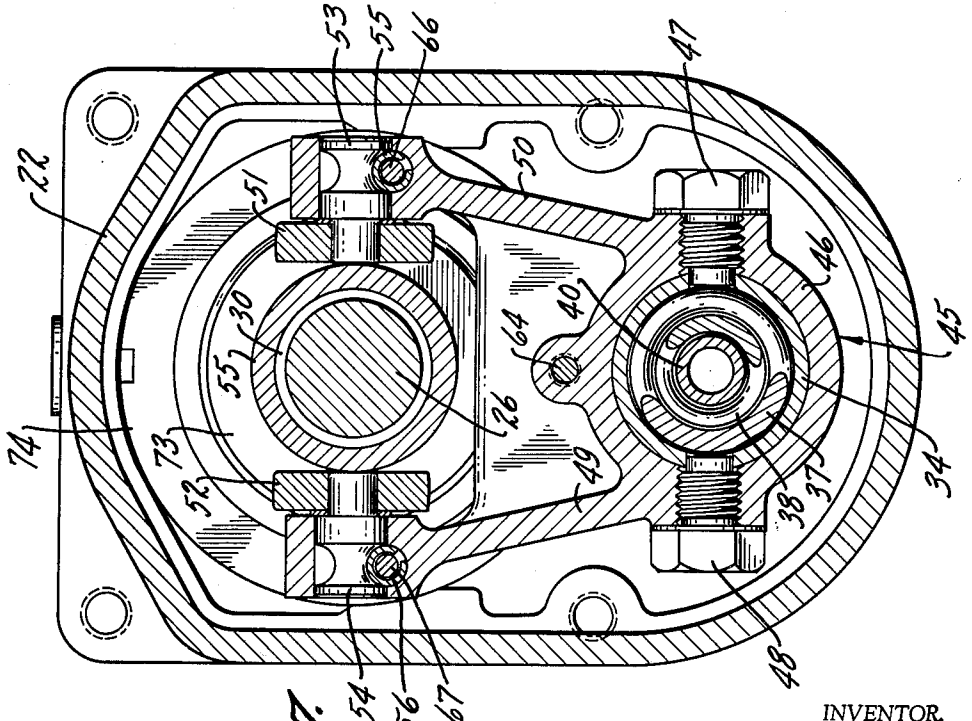


FIG. 7.

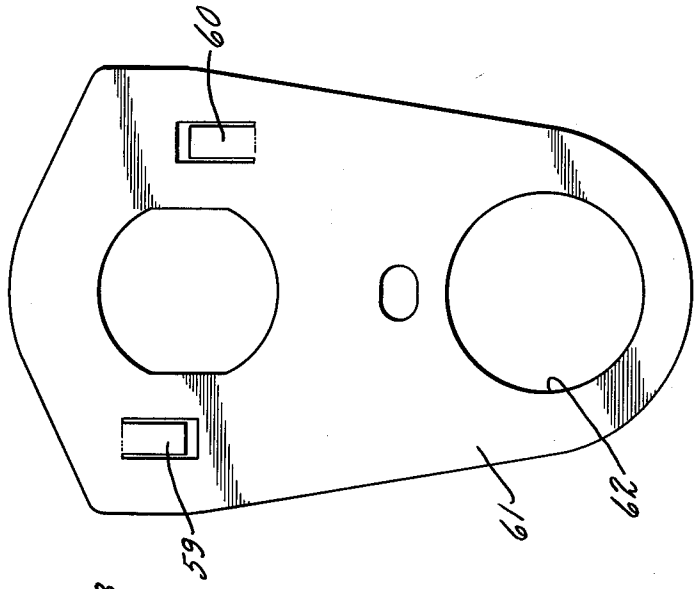
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Fig. 9.



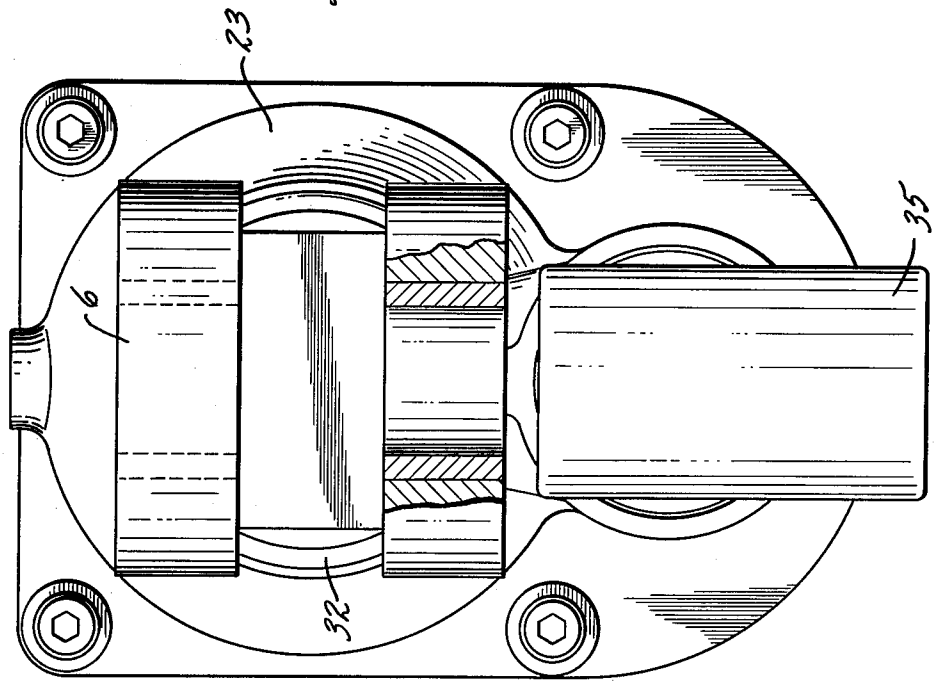


Fig. 10.

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United States Patent Office 3,249,183 Patented May 3, 1966

3,249,183

DOUBLE ACTING SLACK ADJUSTERS

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Filed Apr. 15, 1964, Ser. No. 359,969
15 Claims. (Cl. 188—202)

This invention relates in general to slack adjusters for adjusting slack in the brake rigging of a railway car, and the principal object of the invention is to provide a new and improved double acting slack adjuster for automatically reducing or increasing the slack to maintain optimum brake shoe clearance.

Another object is to provide a slack adjuster of the type having spin-nuts rotatable on a threaded rod in which the device utilizes fewer parts, is of lighter weight, and is constructed more compactly to fit readily in all types of railway cars in position where available space is at a minimum.

Another object is to design an automatic double acting slack adjuster for railway cars which is relatively simple and rugged in construction, protected from dirt and weather, positive and reliable in action, and which is relatively immune from false operation under service conditions.

A further object is to provide a new and improved double acting slack adjuster in which the usual heavy and cumbersome restoring spring for restoring the parts of the slack adjuster upon brake release, is eliminated resulting in lighter weight and reduced friction in the device.

Another object is to design an improved double acting slack adjuster in which the housing of the device is not shifted or rotated when insufficient slack is present as in former devices, but a separate trigger mechanism is operated extending into the side of the slack adjuster to control the spin-nuts and adjust the slack, thereby making for a more simple and compact arrangement of the parts of the device.

With the foregoing and other objects in view, the invention consists in the novel construction, combination and arrangement of parts described and illustrated hereinafter in the accompanying drawings and pointed out in the appended claims.

Referring to the drawings;

FIGURE 1 is a plan view illustrating a typical brake rigging arrangement on a railway car with the slack adjuster of the invention shown therein;

FIGURE 2 is a side view of FIGURE 1;

FIGURE 3 is an end view from the left side of FIGURE 1;

FIGURE 4 is a cross-sectional view of a portion of the left hand end of the slack adjuster;

FIGURE 5 is a cross-sectional view of a portion of the right hand end of the slack adjuster;

FIGURE 6 is an enlarged cross-sectional view of the center portion of the slack adjuster taken between points A and B of FIGURE 1;

FIGURE 7 is a cross-sectional view taken along the line 7—7 of FIGURE 6;

FIGURE 8 is a fragmentary view of FIGURE 7;

FIGURE 9 is a plan view of the pawl plate;

FIGURE 10 is an enlarged right hand end view of the slack adjuster; while

FIGURE 11 is a diagrammatic view of the trigger action.

The improved double acting slack adjuster of the invention is adapted for installation in the brake rigging of a railway car in the usual position between the brake cylinder push rod and brake shoes and specifically as a center rod connection in the brake rigging between the live lever and the dead lever, and when so installed will automatically take up excess slack as the brake shoes wear, and let

out slack as when new brake shoes are installed, in order to maintain the travel of the brake cylinder push rod within the limits prescribed by railroad practice regulations. The present slack adjuster comprises a unitary structure including a dust proof sealed casing **5** connected at the right hand end by the clevis **6** and pivot pin **7** to the center portion of live lever **8**. The upper end of live lever **8** has a pivot pin **9** for connection with a portion of the brake rigging **10** leading to the brake shoes (not shown). The bottom end of live lever **8** is pivoted by pin **11** to the end of push rod **12** of the brake cylinder **13**, having a movable piston therein responsive to the usual brake control of the railway car in a brake application.

The left hand end of the slack adjuster **5** has a tubular rod portion extending from it which is pivoted by pin **14** to the mid-portion of dead lever **15**. This lever **15** in turn is pivoted at **16** at its lower end to a portion of the brake linkage **17** leading to the brake shoes. At its upper end the lever **15** is pivoted at **18** to a part of the railway car frame. Additionally adjacent the live lever **8** (FIGURE 3) there is an actuating lever **20** also pivoted at its upper end by pin **9** and having its lower end loosely slidable and pivoted in a slot formed in bracket **21** supported on the railway car frame. The general arrangement of the foregoing elements is such that outward projection of the push rod **12** by action of the brake cylinder **13** results in the movement of the levers **8** and **15** together with the slack adjuster **5** so that braking pull is applied to linkages **10** and **17** in the direction of the arrows shown, to produce an application of the brakes. In other words, the distance between lever **20** and button **35** is proportional to the travel of the brake cylinder piston.

The slack adjuster **5** is preferably made of two separate hollow sections or casings **22** and **23** bolted together at gasketed flanges formed at their abutting ends as shown. One end of a tubular pull or power rod housing **24** is welded to casing **22** and movable therewith, while the other end is provided with a suitable closure and sealing means **25** slidable around the power rod **26** extending axially through the housing tube **24**. The power rod **26** is disposed for axial shifting movement within the tube **24** as well as housings **22** and **23**. For a substantial portion of its length, within the casings, the power rod **26** is provided with non-self locking threads **30** having a high helix angle upon which a series of spin-nuts are adapted to be rotated as will be pointed out.

Extending from the right hand end of housing **23** and welded thereto is a tube **31** the other end of which is welded to the casing **32** in which the clevis **6** is formed. The threaded power rod **26** is adapted to partially telescope within the tube **31**. A fixed guiding tube **33** is arranged parallel to and below tube **31** and is suitably welded at one end into housing **23** and at the other end into housing **32** as shown. Axially slidable within tube **33** is a trigger tube **34** having a trigger button **35** attached to its right hand end, which button is adapted to contact the mid-portion of actuating lever **20**. The left hand end of trigger tube **34** is slidable through an opening in casing **23** and projects into the casing **22**. A pair of nested compression springs **37** and **38** extend the full length within trigger tube **34** from the button **35** to the stop washer **39** in casing **22**. A guiding stem **40** passes axially through the springs **37** and **38** and is fastened to the washer **39** for support. The springs normally hold and restore the trigger mechanism into the position as shown.

The trigger tube **34** at its end within housing **22** supports and carries along with it a ratchet spool control member **45**, having a lower cylindrical portion **46** through which the trigger tube **34** extends. Set screws **47** and **48** in opposite sides of cylinder portion **46** enter holes in the

sides of trigger tube 34 and firmly anchor the control member 45 to the trigger tube 34. A pair of upstanding arms 49 and 50 straddles the threaded power rod 26 and is provided with rollers 51 and 52 engageable with opposite sides of a spool-shaped ratchet spin-nut 55, there being a relatively minute clearance provided for free rolling contact as nut 55 turns. Spin-nut 55 is rotatable upon the threaded rod 26 under control of the control member 45 as will be pointed out. Rollers 51 and 52 rotate on bearing pins 53 and 54 having support in arms 49 and 50. To hold the bearing pins in place hollow roll pins 55 and 56 extend through the arms 49 and 50.

One end face 57 of spool-shaped spin-nut 55 is provided with a series of ratchet teeth 58 around its peripheral area which are adapted to be engaged by a pair of oppositely disposed pawls 59 and 60, more clearly seen in FIGURE 9. The pawls 59 and 60 are formed in pawl plate 61 the bottom portion of which has an opening 62 through which the trigger tube 34 extends. There is an odd number of ratchet teeth 58, for example, nine, so that only one of the pawls 59 or 60 at a time can engage the teeth 58, thereby providing closer stepping increments of the spool-shaped spinnut 55. The pawl plate 61 is carried along with control member 45 but is rocked at its lower end on pivot point 63 formed in member 45. An adjustable screw 64 threaded into control member 45 has a coiled spring 65 under its head tending to urge the pawl plate 61 towards the spin-nut 55. This is however prevented by a pair of push pins 66 and 67 projecting along opposite sides of the spin-nut 55 and adapted to engage pawl plate 61 and push the pawls 59 or 60 away from the ratchet teeth 58 under certain conditions of operation. The push pins are conveniently journaled and supported in the hollow roll pins 55 and 56.

In addition to the ratchet spin-nut 55 the threaded power rod 26 also has two other spin-nuts 70 and 71 rotatable thereon and several friction clutch surfaces within the housing 23 adapted to control the rotation of these spin-nuts. One of these friction clutch surfaces 72 is formed between the end spool disc 73 of spin-nut 55 and a collar or friction ring 74 threaded into the housing 23, in turn locked in place in housing 23 by the set screw 75. The adjusting spin-nut 70 is arranged on the threaded rod 26 between spin-nuts 55 and 71 and is provided with an edge surface engageable with friction clutch surface 76 on collar 74 and an anti-friction roller bearing 77 pressing against bowed spring washer 78 which in turn rests against the fixed stop ring 79. The third spin-nut 71 is provided with roller bearings 80 on one side thereof resting against bowed spring washer 81 supported on a shoulder formed in casing 23. On the other side of spin-nut 71 there is a rotary disc 82 having rotary sliding fit on spin-nut 71 and providing a friction clutch surface 83 with the casing 23. Another friction clutch surface 84 is provided between the disc 82 and spin-nut 71. Needle thrust bearing 85 is placed on disc 82 and bears against a plurality of "Belleville" disc type springs 86 to normally urge the disc 82 into frictional contact with clutch surface 83. The spin-nut 71 with clutch surface 84 is normally held in engagement by the bowed washer 81 and thrust bearing 80 as shown. In the same normal position shown the clutch surfaces 76 will be disengaged from spin-nut 70 but clutch surface 72 will be engaged by spool end 73 of the ratchet spin-nut 55.

For reasons well understood in the art, the maximum stroke of the brake cylinder push rod 12 in response to a braking application cannot exceed 12 inches, and an optimum range of about 8 inches is selected for the slack adjuster to make its automatic adjustment for abnormal slack, which may be present in the brake rigging or linkage. The 8 inch stroke required is also made up of other elements in the system. The various parts of the brake rigging and slack adjuster are shown in the drawings as they appear in the position with the brakes released and in the running position. When a brake application takes

place the push rod 12 is forced outward by air pressure in the brake cylinder 13 operating live lever 8 and since the upper end of the actuating lever 20 is also pivoted at 9 together with live lever 8, and the lower end of lever 20 is slidably restrained by the bracket 21 (FIGURE 3), the levers 8 and 20 will separate angularly about pin 9. The slack adjuster 5 being pivoted to the center of live lever 8 at pivot 7, the angular movement of both levers 8 and 20 will cause the center edge portion of actuating lever 20 to contact the button 35 after a certain movement of the lever 8. This movement is calculated so that the lower end of live lever 8 will be operated by the push rod 12 over a movement of about 7 or 8 inches before the actuating lever 20 engages the trigger button 35. Any travel of the push rod 12 beyond this distance indicates an excess of slack in the brake linkage or in brake shoe wear.

Assume that there is an insufficient amount of slack in the brake rigging as would be the result of the installation of new shoes for example. It would accordingly be necessary to introduce some slack in the system by increasing the overall length of the slack adjuster. Upon a brake application under these conditions, the slack adjuster 5 will initially move as a solid unit or link in the system. This occurs because the "Belleville" springs 86 force disc 82 tightly into engagement with clutch surface 83 and spin-nut 71 with clutch surface 84 preventing rotation of spin-nut 71 on power rod threads 30. Spin-nuts 55 and 70 are immobile at this time. Since there is insufficient slack in the system the brake shoes will engage the car wheels almost immediately, or before the brake cylinder piston has traveled the required distance thereby creating a certain amount of stress in the linkage and system which increases until the tension of the "Belleville" springs 86 is overcome thereby separating spin-nut 71 and disc 82 from clutch surfaces 83 and 84. The power rod 26 now pulls to the left while the casing 22 pulls to the right and as a result, the spin-nut 71 rotates on the threaded rod 30 and its bearings 80 lengthening the slack adjuster. At the same time ratchet spin-nut 55 disengages from its clutch surface 72 so both this spin-nut 55 as well as spin-nut 70 rotate on the threaded rod 26 to let out slack.

When the required amount of slack has been let out, the lever 20 contacts the trigger button 35 and causes spin-nut 55 to move to the left allowing the spin-nut 70 to engage the clutch surface 76 thereby rigidly coupling the threaded pull rod 26 with the slack adjuster casing. During this movement the ratchet teeth 59 of spin-nut 55 may rotate across the pawls 59 and 60 on pawl plate 61 without effect. Upon release of the brakes, the gravity weight of the brake rigging together with the brake beams and shoes, restores the equipment to the normal position shown with the spin-nuts in a new position on the threaded rod 26. Also during this restoring movement the push pins 66 and 67 in the control member 45 will force the pawl plate 61 away from the ratchet teeth 58 as soon as the rear end of the pins engage the threaded collar 74. It will be noted that in the case of insufficient slack the trigger button 35 does not contact the actuating lever until after slack is let out and that the slack let out takes place upon application of the brakes.

In the event there is an excess of slack in the system such as would be caused by wear of the shoes, loss of one or more shoes, or other causes, the brake cylinder push rod 12 would be operated beyond the maximum 8 inch stroke during which the slack adjuster would move as a solid link in the system as has been explained. When this excess slack condition prevails, the actuating lever 20 engages the trigger button 35 early in the movement of rod 12, pushing the trigger tube 34 inward into the slack adjuster housing and along with it the control member 45. The pawl plate 61 tilts inward on its pivot 63 to move its pawls 59 and 60 toward the ratchet teeth 58 under pressure of the spring 65. The coupling spin-nut

70 engages its friction clutch surface 76 to lock the threaded rod 26 and the casing together as a unit. The let out spin-nut 71 at this time is also in frictional engagement with clutch surface 84, and disc 71 with clutch surface 83, thus locking the parts together. As a further result of the movement of the control member 45 to the left, it spins the ratchet spin-nut 55 to the left along the threaded rod 30 by means of the rollers 51 and 52 arranged on opposite sides of the nut 55, thereby causing the separation of spin-nut 55 and coupling nut 70 on the threaded rod 26 in accordance with the amount of excess slack. As the spin-nut 55 rotates along the threaded rod it ratchets around the pawls 59 and 60.

Upon release of the brakes the weight of the braking system restores the slack adjuster equipment, assisted by the restoring springs 37 and 38 of the trigger mechanism. The ratchet spin-nut 55 however during this return movement is prevented from rotating because the pawls 59 or 60 are now engaging ratchet teeth 58, and since the braking tension is removed from the spin-nuts 70 and 71 due to the right hand inward movement of the threaded rod 26, these nuts spin on the threads to take up the excess slack until surface 72 is engaged by the ratchet spin-nut 55 to halt the further movement. The push pins 66 and 67 engage the edge of collar 74 to release the pawl plate 61 from the ratchet teeth 58 and the control member 45 assumes the normal position as shown.

From the foregoing it will be clear that when there is insufficient slack in the braking system and some must be let out, the trigger mechanism is not effective to control the device, and the slack is let out during the brake application. On the other hand with an excess of slack the trigger mechanism is rendered effective to take up the slack at the time the brakes are being released so that upon a subsequent brake application they will be in normal condition,

Because of the absence of a powerful restoring spring the parts can be made much simpler and lighter and operate more reliably, and the spin-nuts rotate freely with less friction. The equipment is relatively immune to shocks or transient vibrations so that false slack let out or take up cannot possibly occur. Should the pull rod 26 be given an inward shock or thrust, the ratchet spin-nut portion 73 would be pressed much firmer against the clutch surface 72, in addition to the force provided by the control member 45 and springs 37 and 38. Should the pull rod 26 be given a transient outward pull, a false let out is prevented by the spin-nut 71 and friction disc 82 engaging clutch surfaces 83 and 84 under the pressure of the strong "Belleville" springs 86 to hold the spin-nut stable.

Referring now to FIGURE 11, this shows a diagrammatic sketch of the specific sequence of operations which takes place during the relative travel of the actuating lever 20 and its approach to and operation of the trigger button 35. The movement of the level 20 through the distance A occurs during the time slack is let out when sufficient pull or stress is imposed on the slack adjuster by the brake system to cause all of the spin-nuts 73, 70, 71 and disc 82 to be disengaged from their respective clutch surfaces and spin when the brakes are being applied. The small movement indicated at B (about 1/16 inch) immediately prior to the engagement of lever 20 with button 35, stops the let out of slack because the stress in the system causes the spin-nut 70 to engage clutch surface 76. The short movement indicated at C is that in which the slack adjuster is incapable of taking up slack or letting it out. The ratchet teeth 58 are disengaged from the pawls because the ratchet spin-nut 55 has been moved only slightly and spin-nut 70 has engaged clutch surface 76. The movement indicated at D of course is that during which slack take up occurs as the brakes are being released and ratchet spin-nut 55 is rotated outward and spin-nut 70 locked.

While only a preferred embodiment of the invention has been described and illustrated in the drawings, this is not to be in the nature of limitation, and it is obvious to those skilled in the art that certain variations may be conceived within wide limits without however departing from the spirit of the invention.

What is claimed is:

1. An automatic slack adjuster including a housing, a rod reciprocal in said housing, a number of spin-nuts threadably mounted on said rod within said housing, at least one of said spin-nuts being spool-shaped, a number of clutch surfaces longitudinally spaced on said housing for engagement by said spin-nuts, a trigger member slidable in said housing, a roller carried by said trigger member and rotatably engageable with said spool-shaped spin-nut to move the same rotatably on said rod and linearly of said housing and rod in response to relative longitudinal movement of said housing and trigger member, means for locking said spool-shaped spin-nut against rotation on said rod, including a ratcheting surface formed on an end face of said spool-shaped spin-nut and a ratcheting member pivotally carried by said trigger member and having a ratcheting surface yieldingly urged toward spin-nut end face, and means for separating said ratcheting surfaces, including a stop member slidably carried by said trigger member and positioned to engage said ratcheting member when said trigger member and housing are at a predetermined relative position.

2. An automatic slack adjuster including a housing, a rod reciprocal in said housing, a plurality of spin-nuts in said housing and threadably mounted on said rod, a clutch surface on said housing for each of said spin-nuts to lock said rod and housing against relative reciprocation upon engagement by one of said spin-nuts, means yieldingly engaging each of said spin-nuts to urge the same toward one of said clutch surfaces, at least one of said spin-nuts being formed of two segments, the first of said segments having a first clutch surface yieldingly urged at a predetermined force toward engagement with one of said housing clutch surfaces, said first segment having a bore therein slidably and rotatably receiving the second of said segments and having a second clutch surface thereon, the second of said segments being threadably mounted on said rod and having a clutch surface yieldingly urged toward said second clutch surface of said first segment at a force less than said predetermined force.

3. An automatic slack adjuster including a housing, a rod reciprocal in said housing, a plurality of spin-nuts in said housing and threadably mounted on said rod, at least one of said spin-nuts being formed of two segments, the first of said segments having a first clutch surface yieldingly urged toward engagement with said housing, said first segment having a bore therein slidably and rotatably receiving the second of said segments and having a second clutch surface thereon, the second of said segments being threadably mounted on said rod and having a clutch surface yieldingly urged toward said second clutch surface of said first segment.

4. An automatic slack adjuster including a housing, a rod extending into said housing, first and second spin-nuts threaded on said rod within said housing, a trigger member slidable in said housing and engaging said first spin-nut for linear and rotatable movement of said first spin-nut on said rod in response to relative movement of said housing and trigger member, a clutch surface in said housing, means yieldingly urging said second spin-nut into engagement with said clutch surface to lock said rod and housing against relative longitudinal movement when said first spin-nut is moved in one linear direction on said rod, a second clutch surface positioned in said housing for engagement by said first spin-nut, said first spin-nut engaging said second spin-nut and holding said second spin-nut away from said first-named housing clutch

surface against the action of said yielding means when said first spin-nut engages said second clutch surface.

5. In a slack adjuster having a housing, a rod having a threaded portion in said housing and a pair of spin-nuts linearly positionable on said rod and alternatively engaging said housing to lock said rod and housing against relative longitudinal movement, the combination therewith of a third spin-nut threaded on said rod and having a clutch surface, a clutch disc rotatable on said third spin-nut and having a first clutch surface engageable with said housing and a second clutch surface engageable with said third spin-nut clutch surface, and yielding means urging said first clutch surface toward said housing and said third spin-nut clutch surface toward said second clutch surface.

6. In a slack adjuster having a housing, a rod having a threaded portion in said housing and a pair of spin-nuts linearly positionable on said rod and alternatively engaging said housing to lock said rod and housing against relative longitudinal movement, the combination therewith of a third spin-nut threaded on said rod and having a clutch surface, a clutch disc rotatable on said third spin-nut and having a first clutch surface engageable with said housing and a second clutch surface engageable with said third spin-nut clutch surface, and yielding means urging said first clutch surface toward said housing and said third spin-nut clutch surface toward said second clutch surface, said yielding means urging said first clutch surface toward said housing at a predetermined force and urging said third spin-nut clutch surface toward said second clutch surface at a lesser force.

7. In a slack adjuster for use in a brake rigging, a housing, a rod having a threaded portion extending into said housing, said housing and rod being individually secured to different parts of said rigging, a spool-shaped nut threaded on said rod in said housing, a coupling spin-nut threaded on said rod in said housing, a let-out spin-nut threaded on said rod in said housing, a clutch disc rotatable on said let-out spin-nut, cooperating clutch surfaces between said housing and said let-out spin-nut and between said clutch disc and said let-out spin-nut, other cooperating clutch surfaces between said housing and said spool-shaped spin-nut and between said housing and said coupling spin-nut, yielding means urging each set of said cooperating clutch surfaces relatively into engagement with each other at varying predetermined forces, a trigger member having a control arm engaging said spool-shaped spin-nut at all positions of same and effective to move said spool-shaped spin-nut in one direction on said rod and disengage the clutch surfaces between said housing and said spool-shaped spin-nut in response to the presence of slack in said rigging during a brake-applying movement of said rigging, the clutch surfaces between said coupling nut and said let-out spin-nut and said clutch disc remaining locked in engagement on the rod during the movement of said spool-shaped spin-nut.

8. In a slack adjuster for use in a brake rigging, a housing, a rod having a threaded portion extending into said housing, said housing and rod being individually secured to different parts of said rigging, a spool-shaped nut threaded on said rod in said housing, a coupling spin-nut threaded on said rod on said housing, a let-out spin-nut threaded on said rod in said housing, a clutch disc rotatable on said let-out spin-nut, cooperating clutch surfaces between said housing, spool-shaped spin-nut, between said housing and said coupling spin-nut, and between said clutch disc and letout spin-nut, yielding means urging each set of said cooperating clutch surfaces relatively into engagement with each other at varying predetermined forces, a trigger member having a control arm engaging said spool-shaped spin-nut at all positions of same and effective to move said spool-shaped spin-nut in one direction on said rod and thereby disengage the clutch surfaces between said housing and said spool-shaped spin-nut in response to the presence of slack in said rigging during a brake-applying movement of said rigging, lock means carried by said trigger control arm and positioned to lock said spool-shaped spin-nut against rotation on said rod upon completion of said brake-applying rigging movement, said coupling spin-nut, said clutch disc and said let-out spin-nut clutch surfaces being engaged with said housing clutch surfaces during said brake-applying rigging movement to lock said rod and housing against relative linear movement, said last-named clutch surfaces being disengaged by rigging stresses during brake-releasing movement of said rigging to permit relative linear movement of said rod and housing and to take up slack when excessive slack is present in said rigging, the housing clutch surfaces cooperating with said spool-shaped and coupling spin-nuts and the clutch surfaces between said disc and let-out spin-nut being disengaged by brake-applying rigging movement stresses when insufficient slack is present in said rigging.

9. In an automatic double acting slack adjuster for adjusting for variations of slack in the brake rigging of railway cars, a threaded rod and a tubular casing connected in said brake rigging and arranged to either take up or let-out slack, said threaded rod adapted to be shifted axially within said tubular casing, a ratchet spin-nut on said threaded rod, control means on said tubular casing having an actuating arm engaging said ratchet spin-nut, said control means actuated only upon brake application and when there is an excess of slack in said brake rigging, said actuating arm effective to rotate said ratchet spin-nut along said threaded rod a distance equal to the amount of excess slack present, cooperating pawl and ratchet means between said control means and said ratchet spin-nut, ineffective during rotation of said ratchet spin-nut, a coupling spin-nut on said threaded rod, clutch means for locking said coupling spin-nut on said threaded rod to prevent it from rotating thereon during brake application and thereby to couple said threaded rod and said tubular casing together, said ratchet spin-nut being rotated in a direction away from said coupling spin-nut, and means responsive to release of the brakes for causing said control means to lock said pawl and ratchet means together and prevent said ratchet spin-nut from rotating whereby said threaded rod is shifted to take up the excess slack and said ratchet spin-nut is moved in a direction toward said coupling spin-nut.

10. In an automatic double acting slack adjuster for adjusting for variations of slack in the brake rigging of railway cars, a threaded rod and a tubular casing connected in said brake rigging and arranged to either take up or let-out slack, said threaded rod adapted to be shifted axially within said tubular casing, a ratchet spin-nut on said threaded rod, control means on said tubular casing having an actuating arm engaging said ratchet spin-nut, said control means actuated only upon brake application and when there is an excess of slack in said brake rigging, said actuating arm effective to rotate said ratchet spin-nut along said threaded rod a distance equal to the amount of excess slack present, cooperating pawl and ratchet means between said control means and said ratchet spin-nut being ineffective during rotation of said ratchet spin-nut, a coupling spin-nut on said threaded rod clutch means for locking said coupling spin-nut on said threaded rod to prevent it from rotating during brake application and for coupling said threaded rod and tubular casing together, said ratchet spin-nut being rotated along said threaded rod by said actuating arm in a direction away from said coupling spin-nut, said control means operated responsive to release of the brakes for locking said pawl and ratchet means together to prevent rotation of said ratchet spin-nut whereby said threaded rod is shifted along with said ratchet spin-nut in a direction towards said coupling spin-nut to take up the excess slack, and movable pin means on said actuating arm engaging said pawl for disconnecting said pawl from said ratchet means when said ratchet spin-nut has been shifted to normal position.

11. In an automatic double acting slack adjuster for adjusting for variations of slack in the brake rigging of railway cars, a threaded rod and a tubular casing connected in said brake rigging and operable to either let-out or take up slack, said threaded rod adapted to move axially within said tubular casing, a control mechanism in said casing operable only responsive to a condition of excess slack in said brake rigging and upon brake release, a ratchet spin-nut and a coupling spin-nut normally together on said threaded rod, said control mechanism having a pair of arms straddling said threaded rod, rollers on said arms engaging opposite ends of said ratchet spin-nut to move the same on said threaded rod away from said coupling spin-nut in one direction upon brake application, and in the opposite direction towards said coupling spin-nut upon brake release, and means for locking said ratchet spin-nut in only one of the directions it moves.

12. The slack adjuster as claimed in claim **11**, in which the ratchet spin-nut and the control mechanisms are provided with mutual cooperating pawl and ratchet arrangements so that upon brake release the ratchet spin-nut is locked from movement on said threaded rod and said control mechanism shifts both said ratchet spin-nut and said threaded rod together to take up slack.

13. The slack adjuster as claimed in claim **11**, in which the ratchet spin-nut is in the form of a spool having opposite flanged ends between which the rollers are positioned to shift the ratchet spin-nut in opposite directions.

14. The slack adjuster as claimed in claim **11**, in which the ratchet spin-nut is spool shaped having opposite end flanges between which the rollers are positioned to shift, the ratchet spin-nut in opposite directions, one of said flanged ends being adapted to frictionally engage the tubular casing to stop the movement of said ratchet teeth thereon to lock the ratchet spin-nut on the threaded rod.

15. The slack adjuster as claimed in claim **11** in which the ratchet spin-nut and the control mechanism are provided with cooperating pawl and ratchet means arranged so that upon brake release the ratchet spin-nut is locked on said threaded rod whereby said control mechanism shifts both said ratchet spin-nut and said threaded rod in a direction towards said coupling nut, said ratchet mechanism being disengaged when said ratchet spin-nut. has been shifted into engagement with said coupling nut.

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