

May 9, 1933.

W. H. BRYANT

1,908,315

SLACK ADJUSTER

Filed July 13, 1931

3 Sheets-Sheet 2

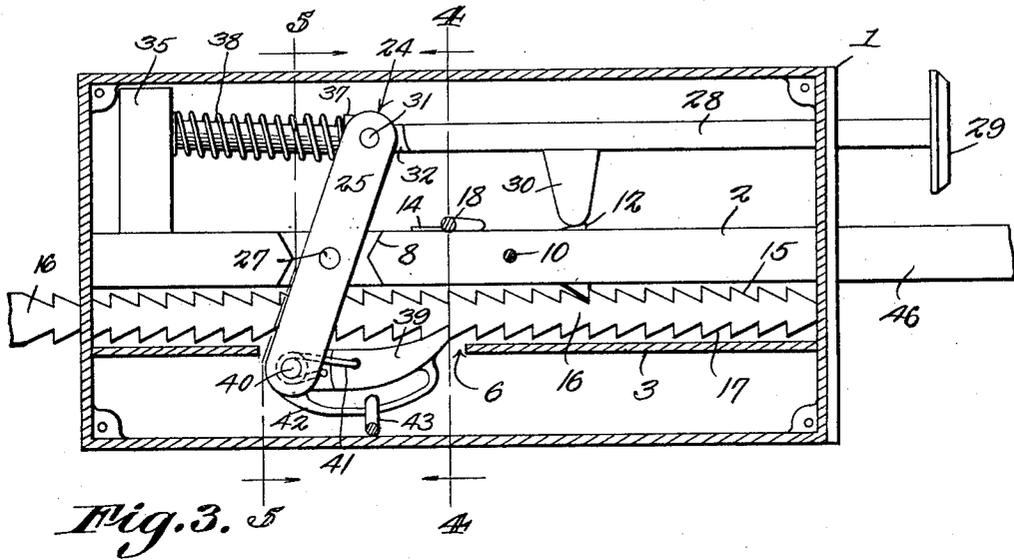


Fig. 3.

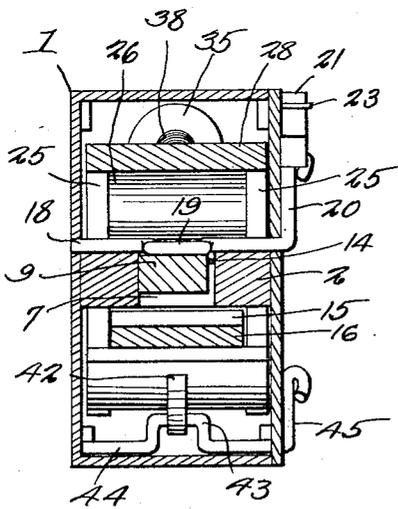


Fig. 4.

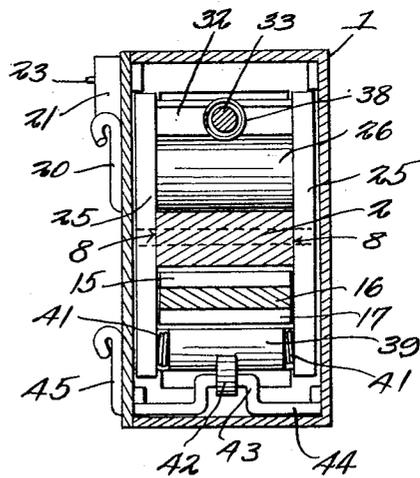


Fig. 5.

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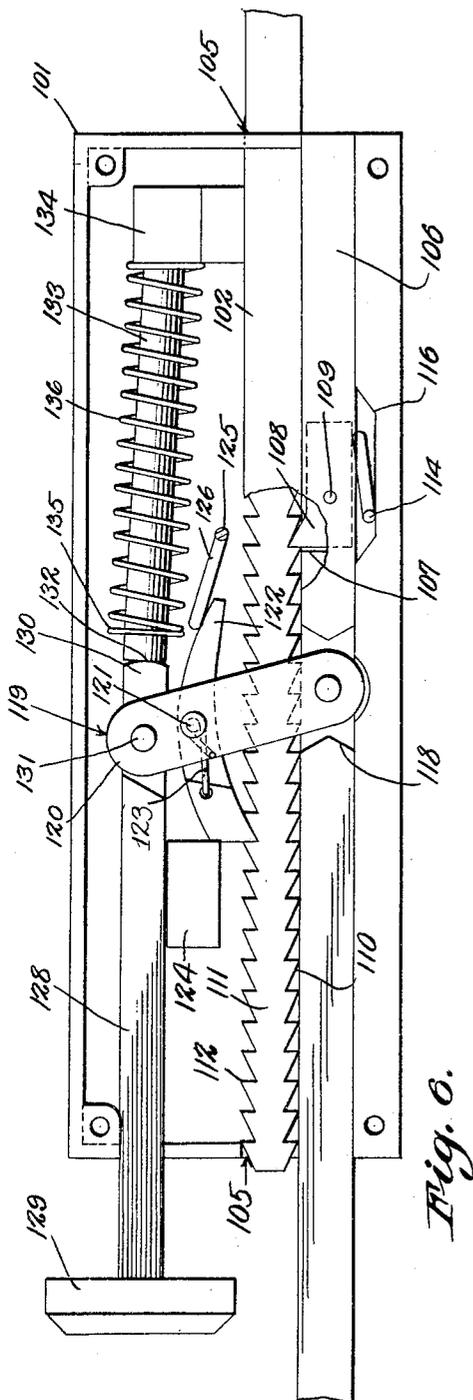


Fig. 6.

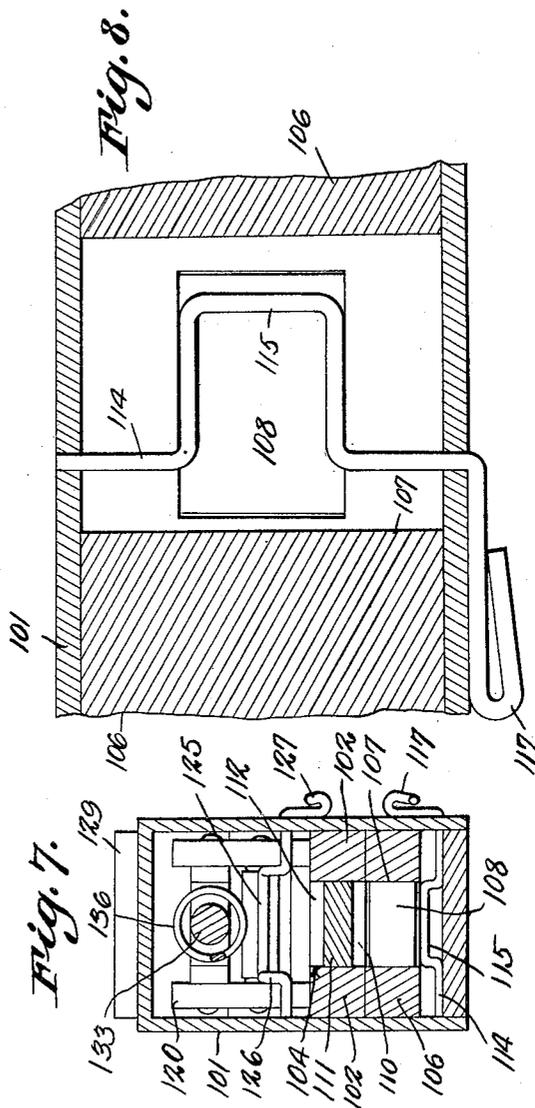


Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE

WILLIAM H. BRYANT, OF NORTH LITTLE ROCK, ARKANSAS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO BRYANT SELF-ADJUSTING BRAKES, INC., A CORPORATION OF ARKANSAS

SLACK ADJUSTER

Application filed July 13, 1931. Serial No. 550,557.

This invention aims to provide novel means whereby the slack can be taken out of a brake rod, on an automobile, a railroad car, or any other vehicle requiring a brake.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:—

Figure 1 shows in elevation, a device constructed in accordance with the invention;

Figure 2 is a vertical section taken through the casing;

Figure 3 is a sectional view taken through the casing, most parts appearing in elevation;

Figure 4 is a transverse section on the line 4—4 of Figure 3;

Figure 5 is a transverse section on the line 5—5 of Figure 3.

Figure 6 is a side elevation showing a modification;

Figure 7 is a transverse section of the modification;

Figure 8 is a fragmental longitudinal section of the modification.

In carrying out the invention, there is provided a brake actuating means or rod comprising two elements 46 and 16. The element 46 has fixed thereto a casing 1 which in effect forms a part of the element. Within the casing 1 is fixed a first partition 2. A second partition 3 is located in the casing 1, below the first partition 2. The partitions 2 and 3 form a guideway 4 in the casing 1. There are holes 5 in the ends of the casing 1, in alignment with the guideway 4. Intermediate its ends, the second partition 3 has an opening 6. The first partition 2 is provided intermediate its ends with an opening 7. There are

notches 8 in the sides of the first partition 2.

A back stop pawl 9 designed to normally hold the elements 46 and 16 in fixed relation to each other is located in the opening 7 of the first partition 2 of the element 46. The back stop pawl 9 is mounted to swing, intermediate its ends, on a fulcrum pin 10, mounted in the first partition 2, and extended across the opening 7. At one end, the back stop pawl 9 has a depending tooth 11. Above the tooth 11, the back stop pawl 9 has an inclined projection 12. A spring 14 is mounted on the first partition 2 and engages with the back stop pawl 9, to swing the right hand end of the back stop pawl 9 downwardly, in Figure 2, so that the tooth 11 cooperates with element or bar 16, which may be regarded as a ratcheted element, having a rack 15, which may be called a first rack on its upper edge. The rack 15 is located on the upper surface of the bar or element 16 which is mounted to slide in the guideway 4 and in the openings 5. On its lower edge, the bar 16 has a second rack, which is designated by the numeral 17. A transverse shaft 18 is mounted to rock in the casing 1 and is provided intermediate its ends with a crank 19, adapted to bear downwardly on the left hand end of the back stop pawl 9. As shown in solid lines in Figure 1 and by dotted lines in Figure 2, the shaft 18 has a handle 20, located outside of the casing 1. A dog 21 is pivotally mounted at 22 on the casing 1, and is adapted to cooperate with the handle 20 of the shaft 18, in a manner which will be explained hereinafter. A stop 23 on the casing 1 limits the upward movement of the dog 21.

The numeral 24 designates an H-shaped lever including side arms 25 connected above the partition 2 by a rounded cross bar 26, the side arms of the lever being received in the notches 8 of the first partition 2, and the lever being fulcrumed intermediate its ends on the pivot elements 27, engaging the side arms 25, and mounted in the first partition 2. The numeral 28 marks an operating member or slide, mounted to reciprocate in one end of the casing 1, and provided, outside of the casing, with a head 29. The slide 28 has a depending finger 30, located within the cas-

ing 1, and adapted to cooperate with the projection 12 on the back stop pawl 9. The slide 28 is provided with a reduced inner end 32 pivoted at 31 to the upper ends of the side arms 25 of the lever 24. A plunger 33 is mounted to reciprocate in a hole 34 in a post 35 fixed on the partition 2. The inner end of the plunger 33 is received in a recess 36 in the part 32 of the slide 28. The plunger 33 has a head 37. A compression spring 38 surrounds the plunger 33. One end of the compression spring 38 abuts against the head 37, and the other end of the compression spring abuts against the post 35. The spring 38 tends to swing the lever 24, to the right in Figure 2.

A feed or second pawl 39 is disposed below the rack bar 16, and operates in the opening 6 of the lower partition 3. By means of a pivot pin 40, one end of the feed pawl 39 is mounted on the arms 25 of the lever 24, at the lower end of the lever. Springs 41 are engaged with the side arms 25 of the lever 24 and are extended around the pivot pin 40. The springs 41 tend to swing the feed pawl 39 upwardly, and keep it in engagement with the lower rack 17 on the bar 16. The feed pawl 39 has an elongated, depending yoke 42, in which works a crank 43 on a shaft 44 mounted to rock in the casing 1. The shaft 44 has a handle 45 external to the casing 1.

It is to be understood that the device forming the subject matter of this application is adapted to be used on railway vehicles, on automobiles, or on anything else which requires a means for operating a brake. By way of illustration, to avoid prolixity in the drawings, it will be presupposed that the structure is used on an automobile, although it is not confined to that method of employment.

The element or stem 46 has sliding movement in a depending bracket 47 mounted on the frame 48 of an automobile. The brake pedal is shown at 49 and is fulcrumed at 50, the brake pedal having an arm 51 which is pivoted at 52 to the forward end of the stem 46. The rear end of the bar 16 is pivoted at 54 to a bell crank lever 53, fulcrumed at 55 on any accessible part of the vehicle. The lever 53 has its opposite end connected to a brake band 56 adapted to cooperate with a drum 57 on the vehicle wheel (not shown), the anchored end of the brake band 56 being designated by the numeral 58.

When a new brake band 56 is mounted in place, the slide 28 is shoved to the left in Figure 2, so that the finger 30 can clear the projection 12 on the back stop pawl 9. The shaft 18 then is rotated by means of the handle 20, to cause the crank 19 to press downwardly on the back stop pawl 9, and raise the tooth 11 of the back stop pawl out of engagement with the rack 15 on the element or bar 16. After the handle 20 has been manipulated, as

and for the purpose stated, the dog 21 is swung downwardly and engaged with the handle 20, to keep the back stop pawl 9 tilted, and to keep the tooth 11 of the back stop pawl out of engagement with the rack 15 on the bar 16. The operator rotates the shaft 44 by means of the handle 45, and the crank 43, cooperating with the yoke 42 on the feed pawl 39, swings the feed pawl 39 down, clear of the rack 17 on the bar 16. The bar 16 now can be moved endwise by hand, so as to adjust the effective length of the connection formed by the members 46 and 16. By a reversal of the operation hereinbefore described, the parts are restored to the position of Figure 2, with the tooth 11 of the back stop pawl 9 in engagement with the rack 15 on the bar 16, and with the feed pawl 39 in engagement with the rack 17 on the bar 16. As the brake band 56 wears, the head 29 on the slide 28 comes into contact with the bracket or abutment 47, and the lever 24 is tilted on its fulcrum 27, the bar 16 being moved to the right in Figures 2 and 3, by the action of the feed pawl 39 on the rack 17 of the bar 16. Upon release of the brakes, the spring 38, acting on the plunger 33, carries the slide 28 to the right, so that the finger 30 on the slide engages with the projection 12 on the back stop pawl 9 and keeps the tooth 11 of the back stop pawl in engagement with the rack 15 on the bar 16.

In Figures 6, 7 and 8, there is shown a brake actuating means or rod comprising two elements 106 and 111. The element 106 has fixed thereto a frame, in the form of a box-like casing 101 provided on its sides with internal ribs 102, forming a guideway 104. There are holes 105 in the ends of the casing 101. The element 106 is fixed in the bottom of the casing 101 so that the casing forms part of the element 106. The element 106 corresponds to the element 46 of the Figure 1 form of the invention. In the element 106 there is a recess 107. A back stop pawl 108 designed to normally hold the elements 106 and 111 in fixed relation to each other is located in the recess 107. The back stop pawl 108 is pivotally mounted, intermediate its ends, on a fulcrum pin 109 carried by the element 106. The back stop pawl 108 is so mounted on the fulcrum pin 109, that the weight of its right-hand portion (Figure 6) will tend to hold its opposite end in engagement with a rack 110, which may be called a first rack, on the lower edge of the element 111 slidable in the guideway 104 and in the holes 105, on the top of the element 106. The rack bar or element 111 has a second or upper rack 112.

A transverse shaft 114 is mounted to rock in the casing 101. The shaft 114 has a crank 115 located below the heavy end of the back stop pawl 108, in a recess 116 formed in the bottom of the casing 101. The shaft 114 is manipulated by means of an external handle 117.

There are notches 118 in opposite sides of the element or stem 106. Into these notches 118 extends the lower ends of the side arms 120 of an H-shaped lever 119 including a cross bar 121 connecting the side arms 120. A feed pawl 122 is pivotally mounted intermediate its ends on the cross bar 121. A spring 123 is engaged with the feed pawl 122 and with the cross bar 121, and tends to maintain one end of the feed pawl in engagement with the rack 112, as shown in Figure 6. A stop 124 extends across the casing 101. One end of the feed pawl 122 is adapted to engage the stop 124, and will thereby be locked in engaging position with the upper rack 112.

A transverse shaft 125 is mounted to rock in the casing 101. The shaft 125 has a crank 126 adapted to engage one end of the feed pawl 122, to lift the opposite end of the feed pawl out of engagement with the rack 112. The shaft 125 is manipulated by an external handle 127.

A member or slide 128 is mounted to reciprocate in one end of the casing 101, on top of the stop 124. The slide 128 has an external head 129, corresponding to the head 29. The slide 128 has an inner reduced end 130 which is pivotally mounted intermediate its ends between the upper ends of the side arms 120 of the H-shaped lever 119. The slide 128 has a rounded end 132 bearing against the inner end of a plunger 133 mounted to slide in a post or guide 134 that is carried by the ribs 102. Near its inner end, the plunger 133 has an abutment 135. A compression spring 136 is disposed about the plunger 133. One end of the compression spring 136 bears against the post or guide 134, and the opposite end of the spring bears against the abutment 135.

The operation of the structure shown in Figures 6, 7 and 8 will be understood readily from what has been stated hereinbefore in connection with the other form. It may be noted, however, that in the form shown in Figures 6, 7 and 8, when the brakes are applied, if the brake bands are worn, when the head 129 comes into contact with the bracket or abutment 47 illustrated in Figure 1, the movement of the plunger 128 will stop while the casing 101 (fixed to the element 106) and the element 111 will continue their movement to the left (Figure 6). The stopping of the movement of the plunger 128 will swing the upper end at the H-shaped lever 119 to the right upon its lower pivot, carrying the pawl 122 to the right to engage in another notch on the element 111. When the brakes are released, the spring 136 will hold the head 129 of the plunger 128 in contact with the abutment 47, while element 106 including casing 101 will return to the right. The action of spring 136 in holding the plunger 128 to the left will cause the pawl 122 to hold the element 111 stationary until the

head 129 of plunger 128 is moved out of contact with the abutment 47 by the continued movement of the brake rod to the right. The adjustment of element 111 with respect to element 106 will therefore be effected by the action of the spring 136 upon the release of the brakes.

Having thus described the invention, what is claimed is:—

1. In a slack adjuster for brakes, a frame, a bar slidable in the frame and having first and second racks, a back stop pawl pivoted to the frame and engaging the first rack, a slide for engagement with an abutment, the slide being mounted to reciprocate in the frame, the slide having means for engaging the back stop pawl to hold the back stop pawl engaged with the first rack, a lever fulcrumed intermediate its ends on the frame and pivoted at one end to the slide, a feed pawl pivoted to the opposite end of the lever and cooperating with the second rack, and spring means for operating the lever to retract the feed pawl and to move said means into engagement with the back stop pawl.

2. A device of the class described, constructed as set forth in claim 1, in combination with means under the control of an operator for moving the feed pawl clear of the second rack, and for moving the back stop pawl clear of the first rack when the slide is moved out of engagement with the back stop pawl.

3. In a slack adjuster for brakes, a frame, a bar slidable in the frame and having first and second racks, a back stop pawl pivoted to the frame and engaging the first rack, a slide for engagement with an abutment, the slide being mounted in the frame, a lever fulcrumed on the frame and pivoted to the slide, a feed pawl pivoted to the lever and cooperating with the second rack, a stop carried by the frame, and spring means for moving the slide and tilting the lever, to cause the feed pawl to advance the bar, and to cause the feed pawl to come into abutment with the stop.

4. In a slack adjuster for brakes, a vehicle having a fixed abutment, a frame movable with respect to the vehicle, a bar slidable in the frame and having a rack mechanism, a back stop pawl pivoted to the frame and engaging the rack mechanism, a lever fulcrumed on the frame, a slide mounted to reciprocate in the frame with respect to the bar, means for pivoting the slide at a fixed point directly to the lever, the slide being engageable with the abutment, to move the slide in one direction, spring means for moving the slide in an opposite direction, and a feed pawl pivoted directly to the lever, independently of the frame, and engaging the rack mechanism of the bar.

5. The combination with a vehicle having an abutment thereon and including brake

actuating means, of a brake slack adjuster comprising two elements included in the brake actuating means, means carried by one of the elements and normally engaging the other element to hold the two elements in fixed relation, a slidable member carried by one of the elements, means operatively connected to the slidable member and engaging the other element, engagement of the abutment with the slidable member upon actuating movement of the brake actuating means causing the slidable member to be held against movement while movement of both of the elements continues, and means to move the slidable member, the engaging means operatively connected thereto and the element engaged by the latter with respect to the first named engaging means when the brake actuating means is released to move in the opposite direction.

6. The combination with a vehicle having an abutment thereon and including brake actuating means, of a brake slack adjuster comprising two elements included in the brake actuating means, one of the elements being ratcheted and the other element carrying a pawl normally engaging the ratcheted element to hold the two elements in fixed relation, a lever fulcrumed on the pawl carrying element, a member slidably mounted on the pawl carrying element, the lever and member being pivotally connected, a pawl carried by the lever and engaging the ratcheted element, the engagement of the abutment with the slidable member when the brake actuating means is moved to brake actuating position causing the slidable member, lever and the pawl carried thereby to be held against movement and means to return said last-mentioned member, lever and pawl to normal position when the brake actuating means is released.

7. The combination with a vehicle having an abutment thereon and including brake actuating means, of a brake slack adjuster comprising two elements included in the brake actuating means, one of the elements being ratcheted and the other element carrying a pawl engaging the ratcheted element to normally hold the two elements in fixed relation, a slidable member carried by the pawl carrying element, means operatively connected to the slidable member and engaging the ratcheted element, engagement of the abutment with the slidable member upon actuating movement of the brake actuating means causing the slidable member to be held against movement while movement of both of the elements continues, and means to move the slidable member, the engaging means operatively connected thereto and the ratcheted element with respect to the pawl when the brake actuating means is released to move in the opposite direction.

8. The combination with a vehicle having

an abutment thereon and including brake actuating means, of a brake slack adjuster comprising two elements included in the brake actuating means, a pawl carried by one of the elements and normally engaging the other element, a slidable member carried by one of the elements, means operatively connected to the slidable member and engaging the other element, means carried by the slidable member to hold the pawl in locking position to prevent relative movement of the two elements, engagement of the abutment with the slidable member upon actuating movement of the brake actuating means causing movement of the slidable member to be stopped, whereby the holding means will be released and the means operatively connected to the slidable member will move the element engaged by the last named means with respect to the other element.

9. The combination with a vehicle having an abutment thereon and including brake actuating means, of a brake slack adjuster comprising two elements included in the brake actuating means, one of the elements being ratcheted and the other element carrying a pawl normally engaging the ratcheted element to hold the two elements in fixed relation, a member engaging the ratcheted element and mounted for reciprocable movement with respect to the pawl carrying element, engagement of the abutment with the reciprocably mounted member upon actuating movement of the brake actuating means causing the reciprocable member to be held against movement while movement of both of the elements continues, and means to move the reciprocably mounted member and the ratcheted element with respect to the pawl when the brake actuating means is released to move in the opposite direction.

10. The combination with a vehicle having an abutment thereon and including brake actuating means, of a brake slack adjuster comprising two elements included in the brake actuating means, one of the elements being ratcheted and the other element carrying a pawl normally engaging the ratcheted element to hold the two elements in fixed relation, a member mounted on the pawl carrying element for relative movement with respect thereto and engaging the ratcheted element, engagement of the abutment with the member upon actuating movement of the brake actuating means causing the member to be held against movement while movement of both of the elements continues and means to move the member and the element engaged thereby with respect to the pawl when the brake actuating means is released to move in the opposite direction.

11. The combination with a vehicle having an abutment thereon and including brake actuating means, of a brake slack adjuster comprising two elements included in the brake

actuating means, one of the elements being ratcheted and the other element carrying a pawl normally engaging the ratcheted element to hold the two elements in fixed relation, a lever fulcrumed intermediate its ends on the pawl carrying element, a reciprocable member mounted on the pawl carrying element, the lever and reciprocable member being pivotally connected, a second pawl carried by the opposite end of the lever and engaging with the ratcheted element, means carried by the reciprocable member to hold the first pawl in locking position, engagement of the abutment with the reciprocable member causing the holding means to be released and the second pawl to move the ratcheted element with respect to the other element and means to move the reciprocable member, lever and second pawl to normal position.

12. The combination with a vehicle having an abutment thereon and including brake actuating means, of a brake slack adjusted comprising two elements included in the brake actuating means, means carried by one of the elements and normally engaging the other element to hold the two elements in fixed relation, a slidable member carried by one of the elements, means operatively connected to the slidable member and normally locked in engagement with the other element, engagement of the abutment with the slidable member upon actuating movement of the brake actuating means causing the slidable member to be held against movement while movement of both of the elements continues, and means to move the slidable member, the engaging means operatively connected thereto and the element engaged by the latter with respect to the first named engaging means when the brake actuating means is released to move in the opposite direction.

13. The combination with a vehicle having an abutment thereon and including brake actuating means, of a brake slack adjuster comprising two elements included in the brake actuating means, one of the elements being ratcheted and the other element carrying a pawl engaging the ratcheted element to normally hold the two elements in fixed relation, a slidable member carried by the pawl carrying element, means operatively connected to the slidable member and engaging the ratcheted element, locking means fixed to the pawl carrying element to normally hold the last named means in engagement with the ratcheted element, engagement of the abutment with the slidable member upon actuating movement of the brake actuating means causing the slidable member to be held against movement while movement of both of the elements continues and the locking means is moved out of contact with the engaging means, and means to move the slidable member, the engaging means operatively connected thereto and the ratcheted

element with respect to the pawl when the brake actuating means is released to move in the opposite direction.

14. The combination with a vehicle having an abutment thereon including brake actuating means, of a brake slack adjuster comprising two elements included in the brake actuating means, one of the elements being ratcheted and the other element carrying a pawl normally engaging the ratcheted element to hold the two elements in fixed relation, a member mounted on the pawl carrying element for relative movement with respect thereto and engaging the ratcheted element, locking means to normally hold the member in engagement with the ratcheted element, engagement of the abutment with the member upon actuating movement of the brake actuating means causing the member to be held against movement while movement of both of the elements continues and the locking means is moved out of contact with the member, and means to move the member and the element engaged thereby with respect to the pawl when the brake actuating means is released to move in the opposite direction.

15. The combination of a vehicle having an abutment thereon and including brake actuating means, of a brake slack adjuster comprising two elements included in the brake actuating means, means carried by one of the elements and normally engaging the other element to hold the two elements in fixed relation, a member mounted on one of the elements for relative movement with respect thereto and engaging the other element, engagement of the abutment with the member upon actuating movement of the brake actuating means causing the member to be held against movement, while movement of both of the elements continues and means to move the member and the element engaged by the latter with respect to the first named engaging means when the brake actuating means is released to move in the opposite direction.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

WILLIAM H. BRYANT.