

June 7, 1932.

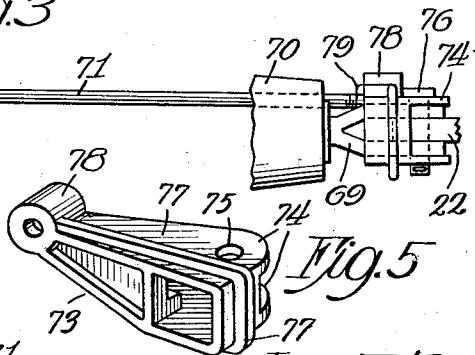
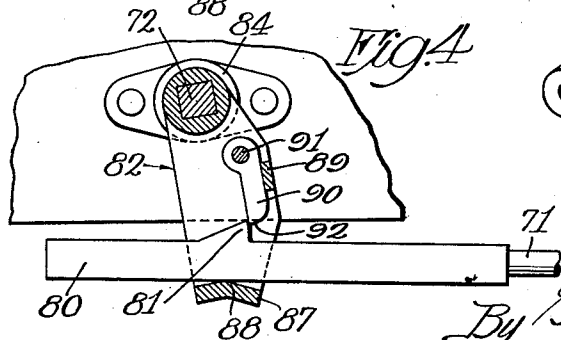
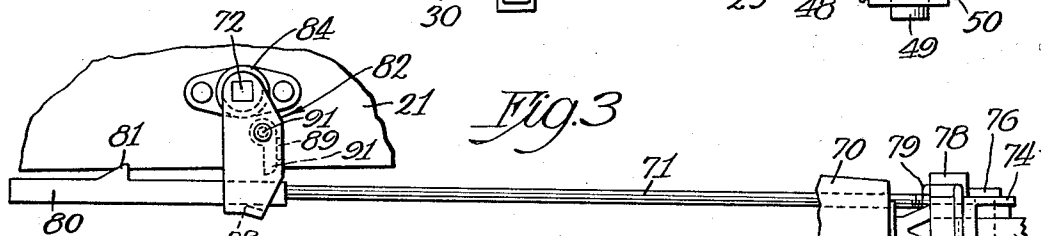
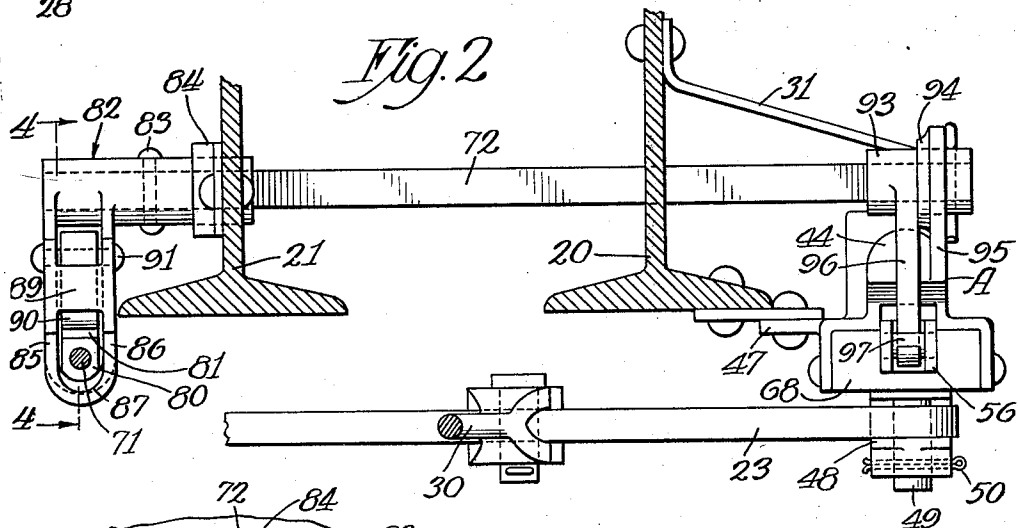
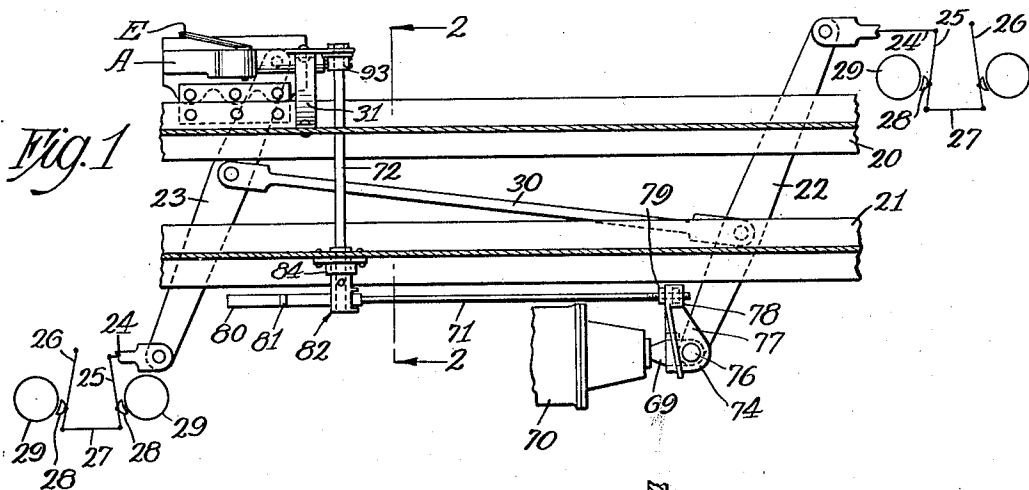
P. B. CAMP

1,862,136

AUTOMATIC SLACK ADJUSTER

Filed April 24, 1931

3 Sheets-Sheet 1



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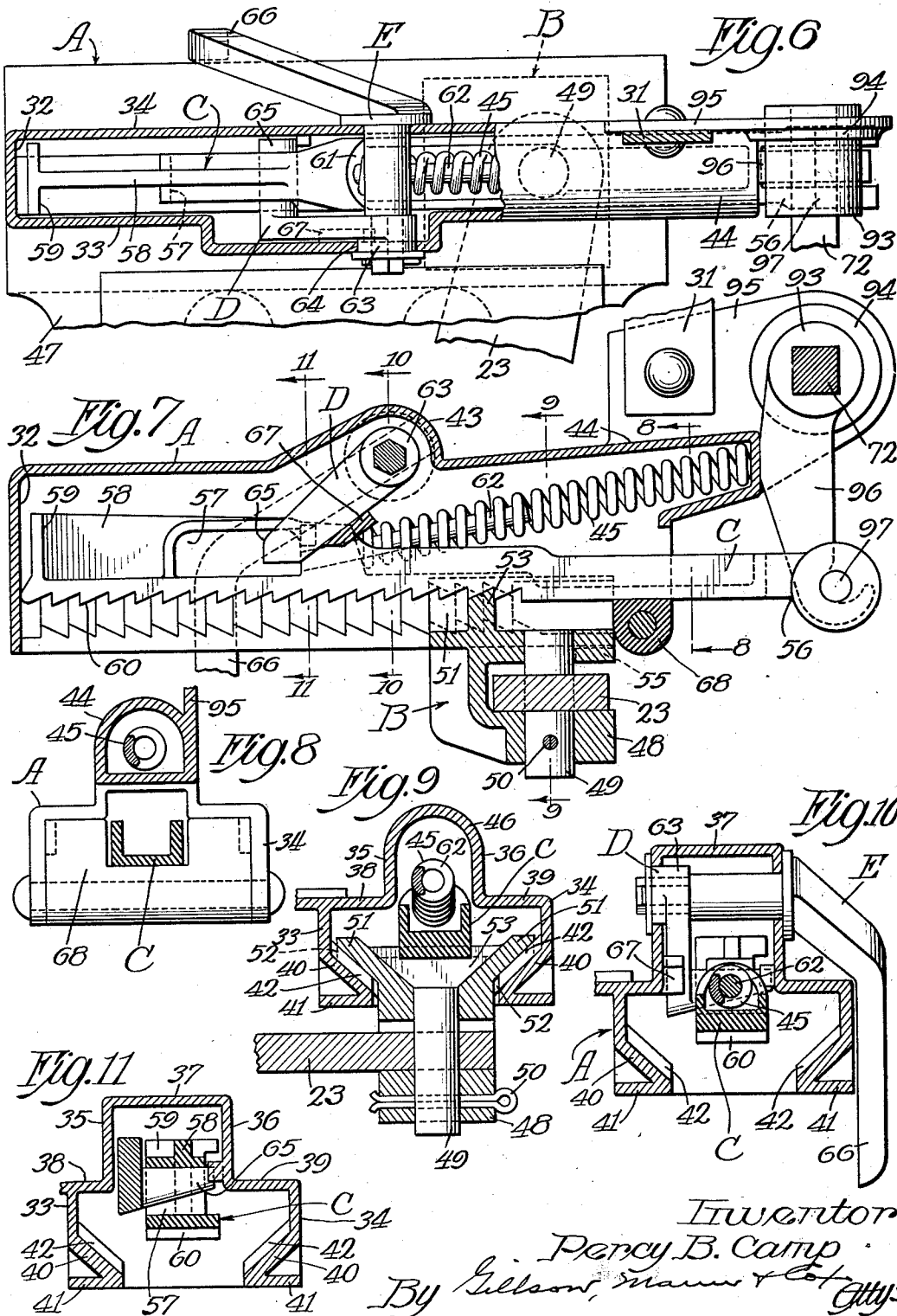
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AUTOMATIC SLACK ADJUSTER

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3 Sheets-Sheet 2



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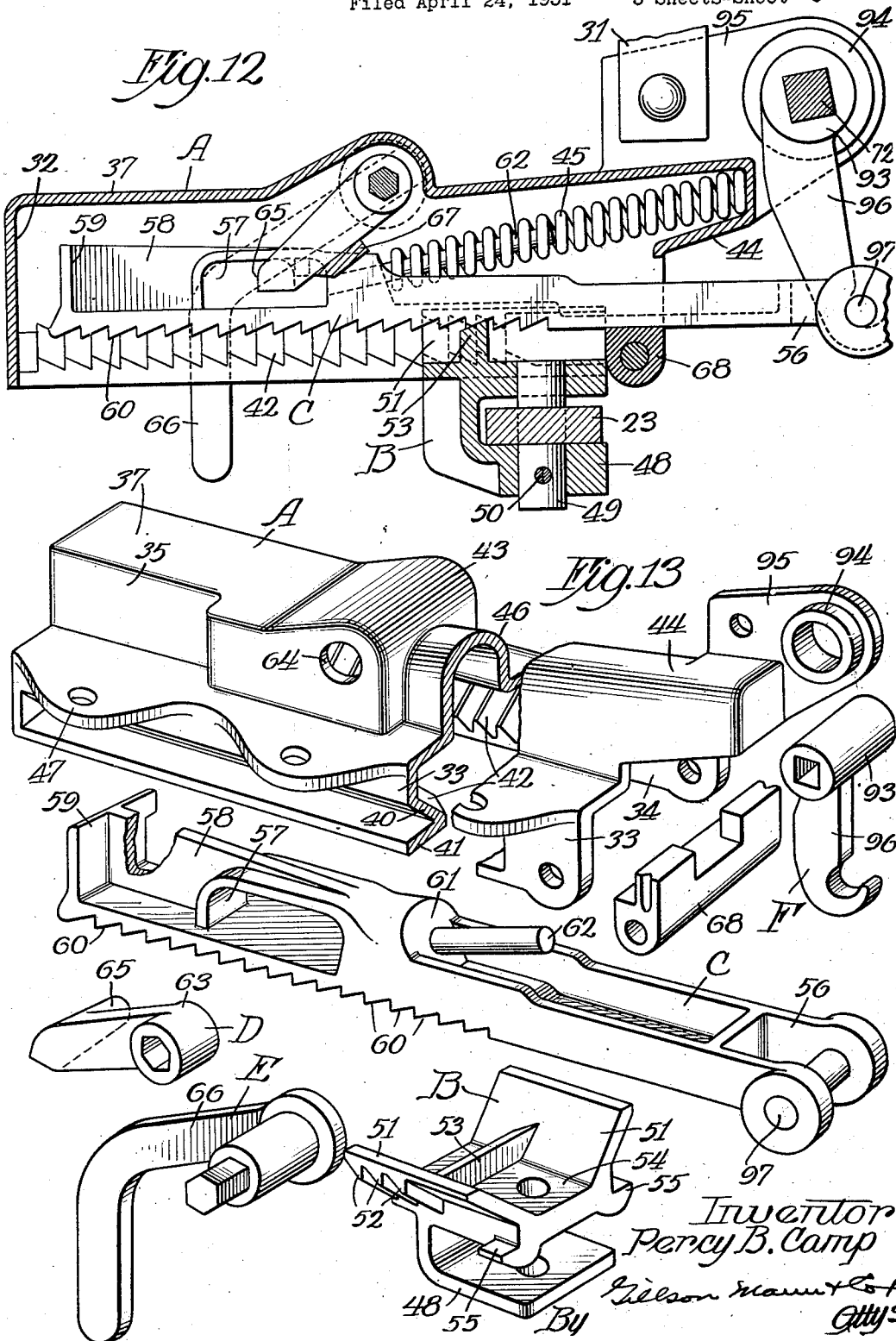
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AUTOMATIC SLACK ADJUSTER

Filed April 24, 1931

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

PERCY B. CAMP, OF MAYWOOD, ILLINOIS, ASSIGNOR TO UNIVERSAL DRAFT GEAR ATTACHMENT COMPANY, A CORPORATION OF ILLINOIS

AUTOMATIC SLACK ADJUSTER

Application filed April 24, 1931. Serial No. 532,573.

It is the purpose of this invention to provide an automatic slack adjuster for railway car brakes operating on the dead cylinder lever to regulate the entire foundation brake gear but limited in its take-up action to a predetermined maximum on any single application of the brake.

Other and further objects and advantages will become apparent as the disclosure proceeds and the description is read in conjunction with the accompanying drawings, in which

Fig. 1 is a plan view of the adjuster installed on freight equipment, the truck brake rigging at each end of the car being shown diagrammatically;

Fig. 2 is a transverse, sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a side elevational view of the actuating mechanism;

Fig. 4 is an enlarged detail section of the rocker arm and actuating rod taken on the line 4—4 of Fig. 2, the parts being shown in the position they assume when the piston travel has exceeded its normal distance;

Fig. 5 is a perspective view of the collar which fits over the push rod and actuates the rock shaft upon excess piston travel;

Fig. 6 is a plan view of the adjuster with a portion of the casing broken away to expose the interior;

Fig. 7 is a longitudinal, sectional view with the parts resting in their normal position;

Figs. 8, 9, 10 and 11 are transverse, sectional views through the adjuster taken on the lines 8—8, 9—9, 10—10, and 11—11, respectively, in Fig. 7;

Fig. 12 is a view corresponding to Fig. 7 but showing the rack being extended from the casing preliminary to shifting the fulcrum of the dead lever; and

Fig. 13 is a composite view of the adjuster showing the various parts in perspective.

But this specific illustration and the correspondingly specific description are for the purpose of disclosure only for it is realized that various changes and modifications can be made in the structure shown in the drawings without departing from the spirit of this invention.

It is characteristic of most brake equipment for freight cars that the dead cylinder lever is fulcrumed on the opposite side of the car from the air cylinder. This arrangement has been chosen to illustrate a particular adaptation of the present invention.

In Fig. 1, there is shown a pair of center car sills 20 and 21 beneath which are suspended the various links and levers of the foundation brake gear. The live cylinder lever 22 and the dead cylinder lever 23 have connected to their respective working ends the usual top rods 24 which draw on the live truck levers 25 and push on the dead truck levers 26 through the intermediate bottom connecting rods 27 to apply the brake shoes 28 to the wheels 29. A center rod 30 connects the two cylinder levers in the usual manner.

The adjuster is rigidly secured to the bottom flange of the car sill 20, as shown in Fig. 2, and is braced by a truss 31 riveted to the web of the sill.

The adjuster in its general organization comprises a casing A, a fulcrum block B, an adjuster rack C, a crank release arm D, a release handle E, and an oscillating arm F.

The casing A comprises an elongated casting having a flat end wall 32, lower side walls 33 and 34, upper side walls 35, and 36, top wall 37, intermediate top walls 38 and 39. The lower side walls are carried inwardly at 40 and then outwardly at 41 to form a seat for the wing-shaped fulcrum block.

Forwardly facing rack teeth 42 are integrally cast with the internal inclined walls 40, the wall 32 being considered the forward end of the adjuster for convenience. The rack teeth 42 extend the full length of the casing except for a small distance at the rear of the casing where the side walls 33 and 34 extend downwardly the full depth of the casing.

The top of the casing has an enlargement 43 to accommodate the release arm and the rear end of the casing is provided with a protruding snout 44 which houses the take-up spring 45. Preferably the upper wall of this portion of the casing is rounded as at 46.

The casing is provided with a suitable flange 47 for its attachment to the car sill, and preferably this flange is cast integrally as an extension of the intermediate top wall 38.

5 The fulcrum block B is intended to anchor the fulcrum of the dead cylinder lever at its proper position with respect to the car body so that normal brake shoe clearance will be constantly maintained. The block is provided with a jaw 48 receiving one end of the
10 dead cylinder lever 23 which is held in place by a pin 49. Ordinarily the pin is driven in from the bottom and a cotter 50 passing through the lower jaw arm prevents accidental dislodgement.

15 The fulcrum block is provided with inclined wings 51 which have integrally cast rearwardly facing rack teeth 52 on one end of their lower side which cooperate with the rack teeth of the casing to anchor the fulcrum block against movement to the right.

20 A rearwardly facing rack tooth 53 bridges the channel 54 between the wings 51 and contacts with the adjuster rack to move the fulcrum block to the left when excess slack exists in the brake system.

25 There is a normal tendency for the rear end of the fulcrum block to rise upon application of the brakes since the stress acting on the pin 49 is not in alignment with the reacting stress between the casing and fulcrum block teeth. To counteract this tendency and in addition to use it to advantage, laterally extending lugs 55 are provided on
30 the block which engage the walls 41 of the casing so that as the brakes are applied, the forces acting on the block act as a lever to maintain the casing and fulcrum block teeth in engagement.

35 The adjuster rack C rides upon the fulcrum block and is held in constant engagement therewith by the inclined take up spring 45. The rear end of the rack is channel-shaped as best shown in Fig. 8 and terminates in a jaw 56 which receives the oscillating arm F that operates the mechanism.
40 The mid section of the rack has an elongated slot 57, the upper and forward walls of which are reinforced by a rib 58 which joins with an upright end wall 59 at the forward end of the rack. The rack teeth 60 are cut into the lower face of the member and face forward.

45 The take-up spring 45 abuts against an inclined face 61 of the adjusted rack and is guided by a stud 62 extending from the rack in the direction of the casing snout 44. For convenience of manufacture, this stud 62 is preferably made separate from the adjuster
50 rack.

55 In adjusters of this type, it is necessary to provide manual means for releasing the fulcrum block so that new brake shoes may be substituted for those badly worn. In the present case, this is accomplished by a crank
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arm 63 pivoted at 64 in the casing and having a stud or lug 65 which rides in the slot 57. The crank arm is operated by a handle 66 extending outside of the casing and normally holding the crank arm down by its own weight. A lug 67 formed on the inner side wall of the casing enlargement 43 limits the downward movement of the crank arm and thus forms a support for the forward end of the adjuster rack.

70 In addition, this lug prevents the take-up spring from dropping the forward end of the rack to such an extent that there is a possibility of the rack becoming disengaged with the fulcrum block.

75 After the various parts have been assembled within the casing, a spacer 68 is bolted in place between the side walls 33 and 34 at the rear of the casing, and furnishes a bearing support for the rear end of the adjuster rack.

80 The adjuster is operated directly from the push rod 69 of the air brake cylinder 70 through the intermediary of an actuating rod 71 and a rock shaft 72. A lost motion is provided between the actuating rod and the rock shaft so that the latter is oscillated only upon excessive piston travel.

85 The push rod 69 carries a collar 73 having spaced side walls 74 which are apertured at 75 to receive a lever pin 76. The collar is reinforced by a rib 77 merging into a drilled head 78 which is slightly offset as shown in Fig. 3 to avoid interference between the actuating rod and the live cylinder lever.

90 The actuating rod 71 is adjustably secured in the head 78 of the collar by nuts 79. The other end of the rod carries a stop member 80 substantially square in cross section and provided with an upstanding lug 81 on its upper face.

95 The rock shaft 72 is rotatably mounted beneath the car body and passes through the webs of the car sills 20 and 21. At one end of the shaft is a rocker arm generally designated 82 which cooperates with the actuating rod 71 to oscillate the shaft when there is excessive piston travel. The rocker arm 82 is sleeved upon the rock shaft, which for convenience has a square cross section, and is held in place by a rivet 83. The sleeve portion of the rocker arm has a rounded exterior which fits within the bearing bracket 84 and forms a support for the rock shaft. The rocker arm 82 has integral depending legs 85 and 86 joining with each other at 87 to form a trough for the actuating rod. Preferably, the trough is peaked as at 88 for a purpose to be later described. A strap 89 connects the mid section of the two legs.

100 A latch 90 is pivoted at 91 between the legs 85 and 86 of the rocker arm and is of such length that it forms an obstruction for the lug 81 when the actuating rod 71 moves a distance greater than normal piston travel. As
105

the lug 81 strikes the toe 92 of the latch, it rotates the rock shaft in a counterclockwise direction, since the strap 89 prevents independent counterclockwise movement of the latch.

On emergency application of the brakes where the piston travel may be two or three inches in excess of its travel under normal conditions, the latch 90 will permit the lug 81 to pass beneath it after the rocker arm has been rotated a predetermined amount. Upon release of the brakes, the lug will swing the latch in a clockwise direction, there being no obstruction, and the parts will resume their normal position.

It will be seen that the peak 88 of the trough 87 slightly raises the actuating rod during the crucial movement of the rod 71 and then lowers it with respect to the pawl 90 when the excess piston travel is more than the desired take-up of the adjuster.

The adjuster end of the rock shaft is equipped with a hooked arm having an exterior bearing surface 93 journaled in a bearing 94 on the casing extension 95. The depending hook 96 engages the cross pin 97 of the jaw 56 of the adjuster rack and operates the device.

The rocker arm latch 90 and the lug 81 of the actuating rod are so proportioned that the maximum rocking of the shaft 72 will produce a linear displacement of the adjuster rack sufficient to take up one tooth of slack but no more. The proportions may, of course, be varied so that any other number of teeth may be taken up on a single application of the brakes. Upon release of the brakes or after the lug 81 has slipped beneath the toe of the latch in case there has been an emergency application of the brakes, the spring 45 will return the rack to its normal position carrying the fulcrum block with it. The tooth 53 of the fulcrum block will then be found engaging the rack tooth immediately forward of the one it was engaging before the brakes were applied. The new position of the fulcrum block is maintained by the correspondingly new engagement between the fulcrum block teeth 52 and the casing teeth 42.

It will be noticed that the fulcrum block is anchored against movement to the right so that upon brake application, the dead lever fulcrum will be fixed. In addition, the casing fulcrum block teeth prevent the fulcrum block from being moved to the right when the adjuster rack is actuated by excess brake travel.

To release the adjuster for the insertion of new brake shoes, it is only necessary to lift the release handle 66 whereupon the fulcrum block may be raised from the casing teeth and moved back to the right.

What I claim, therefore, is:

1. In a brake system for railway cars including a live cylinder lever receiving power at one end from a brake cylinder push rod and

a dead cylinder lever diagonally fulcrumed with respect to said end to the underframe of the car, the combination of means to adjust said dead cylinder lever fulcrum to regulate the system comprising a support for the dead cylinder lever fulcrum, and means for selectively anchoring the said lever fulcrum to the support, said last named means including a rock shaft, an actuating rod moving with the brake cylinder push rod, and a rocker arm on the shaft provided with a lost motion connection with the actuating rod.

2. In a brake system for railway cars including a live cylinder lever receiving power at one end from a brake cylinder push rod and a dead cylinder lever diagonally fulcrumed with respect to said end to the underframe of the car, the combination of means to adjust said dead cylinder lever fulcrum to regulate the system comprising a support for the dead cylinder lever fulcrum, and means for selectively anchoring the said lever fulcrum to the support, said last named means including a rock shaft, an actuating rod moving with the brake cylinder push rod, a rocker arm on the shaft provided with a lost motion connection with the actuating rod, and means for limiting the adjustment during any one application of the brakes.

3. In a brake system for railway cars including a live cylinder lever receiving power at one end from a brake cylinder push rod and a dead cylinder lever diagonally fulcrumed with respect to said end to the underframe of the car, the combination of means to adjust said dead cylinder lever fulcrum to regulate the system comprising a support for the dead cylinder lever fulcrum, and means for selectively anchoring the said lever fulcrum to the support, said last named means including a rock shaft transversely mounted beneath the car, an actuating rod operatively connected to the brake cylinder push rod and moving with and parallel thereto, at least during excessive piston travel, and a rocker arm on the shaft associated with the actuating rod and adapted to rotate the shaft only upon excess piston travel.

4. In a brake system for railway cars including a live cylinder lever receiving power at one end from a brake cylinder push rod and a dead cylinder lever diagonally fulcrumed with respect to said end to the underframe of the car, the combination of means to adjust said dead cylinder lever fulcrum to regulate the system comprising a support for the dead cylinder lever fulcrum, and means for selectively anchoring the said lever fulcrum to the support, said last named means including a rock shaft transversely mounted beneath the car, an actuating rod moving with the brake cylinder push rod and parallel thereto, a rocker arm on the shaft associated with the actuating rod and adapted to rotate the shaft only upon excess piston

travel and a latch device for limiting the amount of adjustment on any one application of the brakes.

5. In a brake mechanism of the type including a live cylinder lever, a dead cylinder lever, and an air cylinder having a push rod operating on the live cylinder lever, the combination of means for adjusting the fulcrum of the dead cylinder lever comprising a fixed casing provided with internal rack teeth, a fulcrum block supporting the fulcrum of the dead cylinder lever and adjustable along the casing, an adjuster shiftable with relation to the fulcrum block upon excess brake travel, spring means for restoring the adjuster to normal position and moving the fulcrum block to adjusted position upon release of the brakes, and actuating mechanism associated with the adjuster, said actuating mechanism including a rod moving with the air cylinder push rod, a rock shaft adapted to be oscillated when the rod is moved a distance in excess of normal piston travel, and an arm mounted on the shaft operatively connected with the adjuster to effect the adjustment.

6. In a brake mechanism of the type including a live cylinder lever, a dead cylinder lever, and an air cylinder having a push rod operating on the live cylinder lever, the combination of means for adjusting the fulcrum of the dead cylinder lever comprising a fixed casing having internal forwardly facing rack teeth, an adjuster rack within the casing movable only upon excess piston travel, a fulcrum block pivoted to the fulcrum of the dead cylinder lever, rearwardly facing rack teeth on the block cooperating with the casing teeth to hold the dead cylinder lever fulcrum immovable during brake application, a rearwardly facing tooth on the block engaging the adjuster rack, spring means operating to return the adjuster to its normal position and the fulcrum block to its adjusted position upon release of the brakes, and actuating mechanism including a rock shaft operatively connected with the air cylinder push rod.

7. In a brake mechanism of the type including a live cylinder lever, a dead cylinder lever, and an air cylinder having a push rod operating on the live cylinder lever, the combination of means for adjusting the dead cylinder lever fulcrum comprising a support fixed to the underframe of a car body, two members freely movable with respect to each other in one direction but held against relative movement in the other direction, one of the members supporting the fulcrum of the dead cylinder lever, actuating mechanism connected to the other member adapted to produce relative movement only upon excess piston travel, said mechanism including a rock shaft and an inclined spring urging the two members into constant engagement and adapted to return the one member to normal

position and move the other member to adjusted position upon release of the brakes.

8. In a brake mechanism of the type including a live cylinder lever, a dead cylinder lever, and an air cylinder having a push rod operating on the live cylinder lever, the combination of means for adjusting the dead cylinder lever fulcrum comprising a support fixed to the underframe of a car body, two members freely movable with respect to each other in one direction but held against relative movement in the other direction, one of the members supporting the fulcrum of the dead cylinder lever, actuating mechanism connected to the other member adapted to produce relative movement only upon excess piston travel, said mechanism including a rock shaft and means for limiting the amount of adjustment during any one application of the brakes, and an inclined spring urging the two members into constant engagement and adapted to return the one member to normal position and move the other member to adjusted position upon release of the brakes.

9. In a brake mechanism of the type including a live cylinder lever, a dead cylinder lever, and an air cylinder having a push rod operating on the live cylinder lever, the combination of means for adjusting the fulcrum of the dead cylinder lever comprising a fixed casing provided with internal rack teeth, a fulcrum block supporting the fulcrum of the dead cylinder lever and adjustable along the casing, an adjuster shiftable with relation to the fulcrum block upon excess brake travel, spring means for restoring the adjuster to normal position and moving the fulcrum block to adjusted position upon release of the brakes, and actuating mechanism associated with the adjuster said actuating mechanism including a rod moving with the air cylinder push rod, a rock shaft adapted to be oscillated when the rod is moved a distance in excess of normal piston travel, an arm mounted on the shaft operatively connected with the adjuster to effect the adjustment, and a latch device associated with the rock shaft for preventing an overadjustment of the brake mechanism.

In testimony whereof I affix my signature.
PERCY B. CAMP.